MANUAL

FOR

Health Visitors, School Nurses,

AND

Teachers of Hygiene.

BY

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PREFACE.

THIS MANUAL is designed primarily for those preparing for the Health Visitors and School Nurses' Examination of the Royal Sanitary Institute, but it is hoped that it will also serve as a reliable guide for those engaged in teaching Hygiene in Schools.

An attempt has been made to epitomise the salient facts of Hygiene and Sanitation, and to arrange these facts in such a manner that they will be readily learnt and easily remembered by the Student.

A knowledge of Home Nursing has been assumed in the compilation of the volume.

O. H.

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LOCOMOTION.

The Locomotive System embraces :—

BONES with Cartilage covering Articular surfaces.

JOINTS connecting bones,
- Hinged, *e.g.*, elbow, knee, ankle.
- Ball and Socket, *e.g.*, shoulder hip.

and containing—

SYNOVIAL MEMBRANE, which secretes oily fluid.

CAPSULE (fibrous tissue), strengthening Synovial Membrane.

LIGAMENTS, tying bones together, and permitting movement.

VOLUNTARY MUSCLES attached to ends of bones, and producing :

Flexion : bending of limb,
Extension : straightening of limb,
Adduction : inward motion of limb,
Abduction : outward motion of limb,
Circumduction : rotatory motion of limb.

MUSCLE crossing joint changes colour, and becomes a TENDON (leader).

Muscular Contraction, example of reflex act requires :

Sensory Surface connected with
Sensory Nerve, which goes to
Nerve Centre, from which
Motor Nerve passes to Muscle.

CONTRACTION results in :—

Shortening of Muscle,
Oxygen consumption,
Carbonic Acid release,
Muscular Acidity release,
Heat production.

STRUCTURE OF MUSCLE.

VOLUNTARY :—Bundles of muscular fibre marked transversely with dark lines. The fibres can be broken up longitudinally into fibrillœ.

INVOLUNTARY :—Bundles of cells found in walls of stomach, intestines, blood vessels, trachea.

HEART MUSCLE :—Branched fibres with faint cross stripes.

NUTRITION.

The tissue cells are constantly undergoing waste and repair. While doing so they give to the blood CO_2 and waste substances, and take from the blood Oxygen and substances necessary for their growth and repair. The blood gets its nourishment from

1.—Oxygen taken into the Lungs during respiration.

2.—Carbon, Hydrogen, Oxygen, Nitrogen from digested food.

Nourishment so produced is distributed to different parts of the body. Some is used up at once, some stored as glycogen in the liver, some as fat.

Conditions Necessary for Nutrition :—

1.—Blood, right condition and composition, sufficiency and suitability.

2.—Healthy Nervous System.

3.—Healthy state of part to be nourished.

SECRETION.

The process by which materials are separated from the blood :—

Structures concerned—

1.—Membranes
    Serous, surrounding the heart, lungs, abdominal organs.
    Synovial, lining the joints, sheaths of muscles and tendons.
    Mucous, lining the digestive, respiratory, urinary and genital organs.
2.—Skin : sweat glands, sebaceous glands and hair follicles.
3.—Salivary glands.
4.—Pancreas.
5.—Stomach.
6.—Liver.
7.—Kidneys.

Apparatus necessary for Secretion—

1.—A membrane.
2.—Certain cells.
3.—Blood vessels.

EXCRETION.

The act of getting rid of waste matter as sweat, urine, fæces. :—

Structures concerned—

1.—Skin.
2.—Lungs.
3.—Kidneys.
4.—Intestines.

WASTE AND REPAIR.

During motion and bodily changes, oxidation reduces the compound substances which form the cells of organs and parts to simpler compounds, heat and energy are produced, and the vital functions performed. In order to repair waste and preserve life, additional compound substances must be supplied by food (solid, liquid and gaseous).

CIRCULATORY SYSTEM.

Consists of :—

1.—**The Heart,** muscular organ lying obliquely between lungs, breast bone in front, spine behind, diaphragm below, and surrounded by fibro-serous membrane (pericardium).

It has four chambers divided by central partition : two upper, right and left auricles, and two lower, right and left ventricles.

2.—**Arteries** (vessels which carry blood from heart), have three coats :—

(*a*) Outer, of fibrous tissue,
(*b*) Middle, of muscular and elastic tissue,
(*c*) Internal, of elastic tissue mainly.

3.—**Veins** (vessels which carry blood to heart), have three coats, like arteries, but middle coat is thinner and less muscular.

4.—**Capillaries** (fine hair-like vessels), which carry blood from arteries to veins : Walls composed of cells only.

CIRCULATION OF BLOOD.

Systemic.—Left Ventricle contracts, forcing blood into Aorta. Branches of Aorta carry blood to all parts of body. These branches divide and sub-divide, becoming capillaries. In Capillaries O is given up, CO_2 taken in, passing to, then from, the Veins, it reaches Right Auricle by superior and inferior Vena Cava (two large veins). From Right Auricle it passes through tricuspid Valve into Right Ventricle.

Pulmonary.—From latter blood is carried by Pulmonary Artery to Lungs, here O is absorbed, and CO_2 given up, and so blood is purified. Pulmonary Veins bring blood to Left Auricle, it then passes through Mitral Valve into Left Ventricle.

Portal.—Abdominal Aorta gives off branches to Abdominal Organs. Portal Vein enters Liver, carrying blood from Stomach, Intestines, Pancreas, and Spleen.

Portal Veins breaks up into Capillaries.

Capillaries bring blood to Hepatic Vein, and from Hepatic Vein it passes into inferior Vena Cava.

NOTE :—The function of the heart is to propel blood by alternate contractions and dilatations.

RESPIRATORY SYSTEM.

Embraces :—

1.—**The Larynx** (voice tube), consisting of Cartilages, Muscles, and Ligaments.

2.—**The Trachea** (wind pipe), consisting of 16 to 20 Cartilaginous rings, incomplete behind.

3.—**The Bronchi,** divisions of the trachea.

4.—**Lungs,** compound elastic bags, occupying greater part of chest within the ribs, and consisting of :

(*a*) Lobes,
(*b*) Lobules,
(*c*) Bronchi,
(*d*) Terminal Bronchioles,
(*e*) Alveolar Passages and Infundibula,
(*f*) Air Sacs,
(*g*) Blood Vessels and Nerves.

MECHANISM OF RESPIRATION.

Each Respiratory acts consists of three periods :—

1.—**Inspiration.**—Chest enlarges in three directions, viz., downwards by contraction of diaphragm, forwarded and laterally by external intercostal muscles raising the ribs.

2.—**Expiration.**—Effected by elastic recoil of lungs and ribs, which force out inspired air, and by raising of diaphragm.

3.—**Pause.**

The number of Respirations amounts to 14 to 16 per minute in Adults.

DIFFERENCES BETWEEN EXPIRED AND INSPIRED AIR.

Expired Air is warmer, is saturated with watery vapour, contains about 5 per cent. less O and about 4 per cent. more CO_2, Ammonia and other poisonous substances.

Vital Capacity of Chest.—Amount of air capable of being expelled from chest after deepest inspiration.

Tidal Air.—Air constantly passing in and out of chest during calm breathing.

Complemental Air.—Air which can be drawn into chest after ordinary inspiration.

Reserve or Supplemental Air.—Air which can be expelled at a forcible expiration over and above Tidal Air.

Residual Air.—Air which still remains after every effort to empty lungs.

IMPORTANCE OF BREATHING THROUGH NOSE.

Air is warmed, enters windpipe nearer body temperature, and filtered.

Germs, dust, etc., are arrested.

Lungs protected against injurious matter.

EFFECTS OF BREATHING IMPURE AIR.

Immediate Effects :—Languor, Drowsiness, Frequent Yawning, Mental and Bodily functions become depressed, Inability to concentrate attention.

Remote Effects :—Anæmia induced, whole system debilitated, Dulness, Apathy, Prone to Colds, Consumption and other infectious diseases spread more rapidly.

Amount of Carbonic Acid given off by Adult :—0·6 cubic feet per hour.

Index of Impurity of a Room :—The CO_2 it contains, because it shows approximately the amount of foul or organic matter.

DIGESTIVE SYSTEM.

Includes mouth, teeth, salivary glands, pharynx, œsophagus, stomach, pancreas, liver, intestines.

ORGAN, etc.	POSITION.	STRUCTURE.	FUNCTION.
TEETH		Each Tooth consists of : 1.—**A Crown,** the part showing above the gum, and covered by a layer of hard material called **Enamel.** 2.—**A Root,** the part imbedded in the jaw bone, having one or more fangs. 3.—**A Neck,** the constriction where the Crown and Root meet. 4.—**Dentine,** substance like bone in structure and composition, constituting the main substance of the tooth. 5.—**Pulp,** substance containing blood vessels and nerves in tooth cavity.	Masticate the Food.
Temporary or milk (20)	2 Incisors 1 Canine 2 Molars } in each half jaw.		
Permanent (32)	2 Incisors 1 Canine 2 Bicuspids 3 Molars } in each half jaw.		
SALIVARY GLANDS	**Parotid,** one on either side between the ear and back part of lower jaw. **Submaxillary,** beneath either side of lower jaw. **Sublinqual,** beneath tongue, on either side.	Numerous lobules, each supplied with a duct and blood vessels, and bound together by connective tissue.	Secrete Saliva, which 1.–Liquefies starchy foods 2.–Changes starch into sugar by the action of its ferment ptyalin.
PHARYNX	Extends from between the Palate to œsophagus.		Serves as a passage for air to Larynx, and food to Œsophagus.

DIGESTIVE SYSTEM—*continued.*

ORGAN, etc.	POSITION.	STRUCTURE.	FUNCTION.
ŒSOPHAGUS	Extends from Pharynx to Stomach passing down through Thorax in front of Vertebral column behind Trachea.	Muscular tube, consisting of three coats :— 1.–Muscular 2.–Submucous 3.–Mucous.	Serves as a passage for food and drink from the Pharynx to the Stomach.
STOMACH	Extends from lower end of Œsophagus to small intestine lying partly against front wall of Abdomen, beneath Diaphragm and under left part of Liver.	Pyriform Muscular Bag, consisting of four coats :— 1.–Muscular 2.–Submucous 3.–Mucous, beset with tubular glands 4.–Serous.	By its churning movement the food is reduced to chyme. By its gastric juice the proteids are converted into peptones.
PANCREAS (Sweet-bread).	Across the front of Spine immediately behind Stomach.	Like Salivary glands, but of looser texture.	Secretes pancreatic juice, containing four ferments :— 1.–Trypsin, converts proteins into peptones. 2.–Amylopsin, converts starch into sugar. 3.–Rennin, curdles milk. 4.–Steapsin, emulsifies and saponifies fats.

Digestive System *continued.*

Organ, etc.	Position.	Structure.	Function.
LIVER	Right side of Abdomen beneath Diaphragm and above Stomach.	Large glandular reddish-brown organ, having two coats :— 1.–Serous 2.–Fibrous. Liver tissue consists of Hepatic cells grouped into lobules, capillaries of Hepatic Artery and Vein, Portal Vein and Bile duct.	Secrets Bile, which :— 1.–Converts starch into sugar. 2.–Emulsifies and saponifies fats. 3.–Assists in absorption of fats Elaborates and stores up Glycogen (a starch-like compound). Prepares Peptones for assimilation.
SMALL INTESTINE	Extends from outlet (pyloric orifice) of Stomach to large Intestine.	Three portions :— 1.–Duodenum 2.–Jejunum 3.–Ileum. Four Coats :— 1.–Serous 2.–Muscular 3.–Submucous 4.–Mucous.	Continues the process of digestion. Secretes a juice (invertin) which changes sugar into invert sugar. Proteins still further converted into Peptones. Fats emulsified and saponified by the bile and pancreatic juice, which have poured into the Intestine. Passes Chyme onwards. Absorbs digested food.
LARGE INTESTINE	Between small Intestine and Rectum.	Three portions :— 1.–Cœcum 2.–Colon 3.–Rectum. Coats, like small Intestine.	Absorbs remaining digested food and water.

DIGESTION SUMMARIZED.

Digestion : the splitting up of food into its various parts by action of certain digestive juices.

Food in the Mouth is masticated by the teeth, and Saliva converts starch into sugar.

Food in the Stomach is reduced to Chyme, Proteids converted into Peptones.

Food in the Intestines : Proteids further converted into Peptones, fats emulsified and saponified by bile and pancreatic juice, and remaining starch converted into sugar.

LYMPHATIC SYSTEM.

Lymph, a yellow alkaline fluid, consisting of—

1.—White corpuscles
2.—Albumen
3.—Fibrin
4.—Extractives
5.—Salts.

Lymph Spaces, in which lymph flows.

Lymphatic Vessels, which drain the spaces.

Lymphatic Glands—Enlargement may be due to :

1.—**Neck**—Verminous heads, Bad Teeth, Enlarged Tonsils, Adenoids, Eczema, affecting region of Mouth, Tuberculosis, and Diphtheria.
2.—**Armpit**—Poisoned wounds of hand or arm, Cancer of Breast, Tuberculosis.
3.—**Femoral**—Poisoned wound of foot or leg.
4.—**Inquinal**—Parasites, Venereal disease.
5.—**Popliteal**—Neglected blister on heel.

Special Lymphatics connected with the Stomach are called Lacteals.

The **Thoracic duct,** commencing opposite second Lumbar Vertebra, and ending in the Subclavian veins, receives all lymphatics and lacteals of body.

URINARY SYSTEM.

Embraces :—

1.—Kidneys 2.—Ureters 3.—Bladder 4.—Urethra.

KIDNEYS.

Two bean-shaped glands at back part of abdomen, one on each side of spine.

Structure :—

Cortical (Secretory) portion, composed chiefly of convoluted tubes, and contains the malpighian bodies.

Medullary (Excretory) portion, composed of 8 to 12 pyramids formed of straight uriniferous tubules. Apices of pyramids open into a dilated portion of Ureter.

Ureters : Ducts which carry the urine from Kidneys to Bladder.

Bladder : Thin walled membranous bag in the pelvis holding urine brought to it by Ureters.

Urethra : Duct conveying urine from Bladder

Functions :—

Secretes urine, consisting of water and waste products (urea and uric acid), which it separates from blood.

Formation of Urine :—

Blood circulating through Kidneys permits passage of water and salts through capillaries. Waste material is extracted from blood by certain selective cells, and mixes with urine secreted by Kidneys.

NERVOUS SYSTEM.

1. **CEREBRO-SPINAL,** including the brain, spinal cord certain ganglia, sensory or afferent nerves, which carry impressions to a centre in the brain or spinal cord ; motor or efferent nerves, which bring back messages from the centre to muscles, glands, etc.

2.—**SYMPATHETIC,** consisting of ganglia and nerves supplying the involuntary muscles of the body.

Grey matter consists of:
- 1.—Nerve cells.
- 2.—Nerve tubules.
- 3.—Pigment.
- 4.—Blood Vessels and Neuroglia.

Function of Grey matter of Brain—

1.—It is the seat of memory, intellect, and the emotions.

2.—It contains centres of special sense as sight, hearing, touch, and smell.

CUTANEOUS SYSTEM.

Skin.

Structure :—

Epidermis, consisting of cells
Dermis, in the projections of which are touch corpuscles, nerves and capillary loops
Sweat glands in the tissue beneath the dermis
Hair follicles which enclose the hair and its roots
Sebaceous glands, which secrete an oil for the hairs.

Functions :—

1.—Protects the deeper parts from injury.

2.—Acts as organ of touch.

3.—Regulates body temperature by dilatation or contraction of its blood vessels.

4.—Assists by its sweat glands in the excretory work of the kidneys.

5.—Can absorb certain substances applied to it, e.g., Tincture of Iodine, Ointments.

STRUCTURE AND ARRANGEMENT OF THE EYE.

Sclerotic (white of eye) : dense fibrous membrane.

Cornea (transparent) : continuation of Sclerotic in front.

Choroid : network of blood vessels internal to Sclerotic

Pupil : central hole.

Retina : inner coat, containing terminations of Optic nerve, rods and cones.

Iris : (a circular contractile diaphragm) is under the choroid.

Contents :—

Aqueous Humour in chamber between lens and cornea.

Crystalline Lens : transparent, solid body behind pupil.

Vitreous Humour : jelly-like material behind lens.

Muscles, 6 in number, attached to outside of eye: 4 straight, 2 oblique.

Functions of Lens :—

Most important refracting structure.
Focuses rays on retina.

EAR.

External Ear (Auricle) : collects sounds.

Middle Ear (Tympanum) : small cavity in temporal bone, transmits sounds, and contains 3 small bones (Ossicles)—

(*a*) Malleus (hammer bone)
(*b*) Incus (anvil)
(*c*) Stapes (stirrup).

Membrana Tympani : thin transparent membrane forming outer wall of tympanic cavity, receives sound vibrations.

Internal Ear (Labrynth) : delivers sounds to auditory nerve ends.

Comprises : Vestibule,
Semicircular Canals,
Cochlea.

Eustachian Tube : passage connecting pharynx with middle ear.

IMPORTANCE OF CLEANLINESS.

Washing :—

Keeps skin in good condition
Promotes action of sweat glands, sebaceous glands, and hair follicles.
Removes surface waste material.

Dangers of Neglect :

Dead scales and dirt collect, which block pores, and check action of sweat and sebaceous glands
Impairs sense of touch
Disturbs heat regulating mechanism (contraction and dilatation of blood vessels)
Kidneys and lungs overworked may become diseased.
Lice encouraged.

Composition of Sweat :—

1.—Fats,
2.—Fatty Acids (acetic, butyric, formie),
3.—Nitrogenous bodies (urea, ammonia),
4.—Salts (sodium and potassium chloride).

IMPORTANCE OF ATTENTION TO ACTION OF BOWELS.

Daily action should be encouraged, and desire to go to stool never repressed.

Dangers of Neglect :—

Habitual constipation,
Resorption of harmful matters from retained fæces,
Headache, chlorosis, languor, debility, mental depression, piles and varicocele may occur.

SOAP.—Objects and Use.

Soap, a fatty compound, containing Stearic, Oleic, and Palmitic acids with either :—

1.—Potassium, forming soft soap, or
2.—Sodium, forming hard soap.

Used with Water, it :—

1.—Ensures rapid removal of dirt and extraneous matters which collect and dry on skin, rendering body sweet, clean, and free from irritation.
2.—Promotes healthy action of hair follicles, sebaceous and sweat glands.
3.—Averts tendency to lice and skin disease, and assists action of kidneys.
4.—Removes dirt, grease, etc., from clothes.

N.B.—Removal of dirt from skin depends on chemical action ; the acid unites with the fatty matter secreted by the sebaceous glands and certain salts of the dirt, the resulting compound being easily removed.

BATHS CLASSIFIED.

1.—Warm, 89 to 90 degrees Fahrenheit
2.—Hot, 100 to 106 degrees Fahrenheit
3.—Cold, 51 to 60 degrees Fahrenheit
4.—Tepid, 85 to 90 degrees Fahrenheit.

Effects of a Warm Bath :—

1.—Skin is flushed with blood, blood vessels dilate, internal organs (lungs, liver, spleen, heart and brain) are temporarily deprived of some of their blood supply.

2.—In certain diseased organs, benefit will follow from relief afforded to congested organs.

Bath too Prolonged, may Cause :—

1.—Faintness, owing to heart or brain being deprived of blood.

2.—Anæmia.

3.—Sleeplessness.

Effects of Cold Bath :—

1.—Contraction of surface blood vessels.

2.—Blood sent inwards, lungs, liver, heart, spleen and brain flushed with blood.

3.—Stimulation of sound organs.

4.—Possible injury of delicate organs by shock.

5.—Possible apoplexy and kidney congestion.

SEA BATHING.

Advantages :

1.—Bathing takes place in healthy surroundings (fresh air and sunshine).

2.—Ozone inhaled.

3.—More stimulating than ordinary bath.

4.—Entails vigorous exercise, with its consequent beneficial results.

5.—Reduces susceptibility to " colds."

Abstain from Bathing :—

1.—During fasting.

2.—When fatigued.

3.—Until two hours after a meal.

4.—In old age.

5.—If heart or lung diseased.

6.—If subject to fits.

HABITS.

Those to be Encouraged.

Eating.—Meals should be taken at regular intervals. Slow and thorough mastication cultivated.

Bowels.—Daily action at fixed hours.

Skin.—Daily cleansing and complete bath not less than once weekly.

Teeth.—Daily cleansing, especially after last meal.

Rest and Sleep.—Early and regular hours.

Exercise.—Daily, preferably in the early morning.

Those to be Condemned.

Drinking before meals.
Alcohol and smoking to excess.
Opium eating, Morphia taking, and excessive use of condiments.

EFFECTS OF PHYSICAL EXERCISE.

1.—Quickens circulation, rendering temperature more equable.

2.—Quickens respiration, more Oxygen taken in, and more Carbonic Acid given out.

3.—Muscles made firmer, restoring those wasted or ill-developed.

4.—Increases action of skin, and evaporation from its surface.

5.—Improves digestion, promotes healthy activity of the bowels, kidneys, and other excretory organs, facilitating removal of excretal matters.

6.—Assists growth of bones in early life.

7.—Preserves healthy mind.*

* *Circulation, respiration, firmer muscles, skin, digestion, growth of bones, and healthy mind.*

REST.

Effects :—

1.—Relieves physical and mental fatigue.
2.—Expedites child's educational progress.
3.—Promotes muscular and nervous energy, increasing output of labour.
4.—Increases functional activity of organs, and rapid removal of waste and effete material from system.

SLEEP.

Effects :—

1.—Rests brain.
2.—Renews expended energy.
3.—Reduces tissue waste.
4.—Increases tissue growth.
5.—Reduces work of certain muscles (Respiration Circulation).
6.—Maintains health and vigour.

Insufficient Sleep will Cause :—

1.—Physical and mental deterioration.
2.—Dullness, apathy, want of attention.
3.—Nervous disorders.
4.—Slow progress in education.

Amount Required :—

Up to 6 months	... ...	20 hours
6 months to 1 year	... ...	18 ,,
1 year to 2 years	... ...	17 ,,
2 years to 3 years	... ...	16 ,,
3 ,, ,, 4 ,,	... ...	15 ,,
4 ,, ,, 5 ,,	... ...	14 ,,
5 ,, ,, 6 ,,	... ...	13½ ,,
6 ,, ,, 7 ,,	... ...	13 ,,
7 ,, ,, 8 ,,	... ...	12½ ,,
8 ,, ,, 9 ,,	... ...	12 ,,
9 ,, ,, 10 ,,	... ...	11½ ,,
10 ,, ,, 12 ,,	... ...	11 ,,
12 ,, ,, 14 ,,	... ...	11½ ,,

SIGNS OF FATIGUE.

Sleepiness, Drowsiness, Dullness.
Drooping head (forwards or laterally), Yawning and Inattention generally.

AIR AND VENTILATION.

Air is a mixture of gases, in which dust may be suspended.

Composition :—

Oxygen	...	20·9	per 100 parts	
Nitrogen	...	79·0	,,	,,
Carbonic Acid		·04	,,	,,

Traces of Argon, Helium, Watery vapour.

Town Air contains in addition, traces of Hydrochloric Acid Ammonia, Sulphur, and Nitrous gases.

To Estimate the Amount of Carbonic Acid in a Room :

Take a bottle into which the air of the room has been introduced, add lime water, and shake. If milkiness is produced CO_2 is present, the CO_2 combining with the lime and forming Carbonate of Lime.

Amount of Air for Adult=3,000 cubic feet per hour.

Amount of Space for Adult=1,000 cubic feet.

To Calculate the Cubic Space in a Room :

Multiply the length by the breadth and by the height.

To Calculate Superficial Space :—

Multiply length by the breadth.

What Constitutes Overcrowding in a Room ? :

Anything below 400 cubic feet in which persons both live and sleep, or below 300 cubic feet for sleeping purposes alone (two children count as one adult).

Effects of Overcrowding :—

1.—Directly causes and favours spread of disease, especially summer diarrhœa, consumption, whooping cough, measles.

2.—The greater the number of persons, the greater is the risk of spread.

3.—Is closely associated with pneumonia, rickets, typhus, influenza, and sore throat.

4.—Leads to moral and physical deterioration, anæmia, loss of appetite, impaired nutrition, lethargy.

To Determine the Sufficiency of Ventilation :-

1.—Find out the cubic space and floor space per person, and the relation to each other.

2.—The number of cubic feet of fresh air which each person receives per hour.

3.—The completeness of air circulation throughout the room. Note the various openings, distance between them, how they open.

4.—Examine the quality of the air by smell, etc.

Forces in Nature which assist Ventilation :

1.—Diffusion of gases—Every gas diffuses inversely as the square root of its density. Diffusion goes on through pores of bricks, stone chinks, openings produced by imperfect carpentry.

2.—Differences in temperature—When air is warmed it expands and rises to the upper part of the room, and escapes if there is an opening.

3.—Perflation—Impure air is driven out of the room by the force of large masses of air entering at open doors and windows.

4.—Aspiration—Wind blowing over the opening at the top of the chimney creates a vacuum, and air from the room immediately rushes up to fill this vacuum.

Natural Ventilation is effected through chimneys, doors, and windows, aided by such arrangements as :—

1.—Hinckes—Bird Window ; the lower sash of the window raised 3 or 4 inches, and the space thus made filled with a piece of wood in its entire length, ventilation taking place at the middle sash.

2.—Louvre Pane ; several parallel panes of glass, each directed upwards ; the incoming air is directed upwards.

3.—Ellison's Ventilating Bricks placed in the wall.

4.—Tobin's Tube fitted into the walls about 8 feet from the floor level.

5.—M'Kinnell's Ventilators—Two open tubes, one inside the other. Fresh air descends by the outer tube, the foul air ascends by the inner one.

6.—Sheringham Valve—An arrangement by which the flow of air through the opening in the wall can be regulated at will.

Artificial Ventilation :—

1.—Propulsion or Plenum Method (for large Schools) : a large fan drives fresh air into the basement of the building, and shafts distribute this to the class rooms.

2.—Extraction or Vacuum—Foul air is extracted by fans or upcast shafts.

Natural and Artificial Ventilation Compared :

Natural	*Artificial*
Cheaper than artificial.	Can be more readily controlled.
Less effective for large buildings.	Air may be cleansed, cooled or warmed, dried or moistened, as required.

WARMING.

Sources of Heat Oxidation of the living tissues, complex substances being split up into simpler substances in the process of waste and repair.

Regulation of Heat depends upon the Nervous System. COLD contracts the blood vessels, reduces the surface blood supply, checks perspiration, less loss of heat results. HEAT dilates the blood vessels, increases surface blood supply, more heat is lost.

Body Heat is Increased :—

1.—Wherever arteral blood comes in contact with active protoplasm, chemical changes taking place.

2.—By friction of contracting muscles.

3.—Hot liquids and foods.

Body Heat is Reduced :—

1.—By the skin, evaporation of the perspiration, radiation and conduction.

2.—By the lungs, evaporation of the water of perspiration and warming expired air.

3.—By the escape of excreta.

Heat may be Distributed :—

1.—By **Radiation :** the passage of heat from hotter to colder bodies, e.g., open fire, the heat varies inversely as the square of the distance.

2.—By **Conduction :** the passage of heat from one particle of a body to another particle of the same body e.g., the passage of heat along a poker when one end is placed in the fire.

3.—By **Convection :** the conveyance of heat by moving masses of air, e.g., heating by hot water pipes.

CONDUCTING POWER OF BUILDING MATERIALS

(IN ORDER OF MERIT).

1.—Copper.
2.—Iron.
3.—Lead.
4.—Slate.
5.—Glass.
6.—Water.
7.—Brick.
8.—Asphalt.
9.—Wood.

METHODS OF HEATING.

METHOD.	ADVANTAGES.	DISADVANTAGES.
OPEN FIRES (Galton type, which ensures a constant supply of warm fresh air, is the best).	Cheerful. No impurities added to the air. Act as ventilators.	Wasteful. Costly. Unequal distribution of heat.
CLOSED STOVES.	Clean. Economical. Requires little attention. Transmit heat uniformly	Don't assist ventilation. Air gets stuffy and dry (tins of water placed on the stove will prevent this). Overheating will char organic impurities, and give rise to bad smells. Carbon monoxide (a poisonous gas) is formed.
GAS FIRES. Forms : Bond's Euthermic stove Reflector stove. Condensing stove. Rows of gas flames burning a mixture of coal gas and air playing on lumps of asbestos.	Clean. Convenient. Require little attention	More expensive than coal fires.
HOT-WATER PIPES.	Less labour entailed than in open fires. More equal distribution of heat. Air less charged with organisms.	Less cheerful than open fires. Air less fresh than open fires.
Low Pressure System : Cast iron pipes are attached to boiler in the basement, branch pipes carry the water to each room.	Easy to heat all parts of a building. Very suitable for Hotels, Hospitals, Churches.	Pipes at top of circuit may freeze.
High Pressure System : (Perkins) Wrought iron pipes, heated by passing through a fire carries water heated to 300° Fah. Expansion tubes are fixed at the top of the system.	Ditto.	Pipes may burst from explosion.

NOTE.—The circulation of water is caused by the heated water expanding and rising to a higher level, giving up its heat to the building, and returniug cooled by the lower pipe. The temperature of a room should be kept at 60° Fah. ; never below 45° Fah.

EXAMPLES OF ROOMS HEATED BY RADIATION, CONVECTION, CONDUCTION.

Radiation—Open fires and Gas fires.

Convection—Hot pipes and Stoves.

Conduction—Stoves, the heat from the fire passing to the walls of the stove, and from the walls is given off by radiation.

Essentials of a Good Fire Grate :—
(Teale)

1.—Much fire brick, fire brick back and sides.
2.—Little iron.
3.—Back of fire brick should lean or hang over the fire.
4.—Bottom of fire deep from before backwards.
5.—Slits in the bottom of the fire narrow.
6.—Bars in front narrow.
7.—Space beneath fire closed by an economizer; this excludes air, and ensures combustion.

NOTE : **Latent Heat** is the number of units of heat absorbed by the unit of mass of the substance in passing from the solid to the liquid state without change of temperature.

Specific Heat is the ratio of the amount of heat required to raise the temperature of any mass of the substance 1° Centigrade from the given temperature to the amount of heat required to raise the temperature of an equal mass of water from 0° Centigrade to 1° Centigrade.

EFFECTS OF RESPIRATION AND COMBUSTION UPON COMPOSITION OF AIR.

Respiration :—

1.—Expired air is warmer than inspired air.
2.—Expired air contains about 5 per cent. less Oxygen, and about 4 per cent. more Carbonic Acid.
3.— ,, ,, Ammonia, probably due to carious teeth, or to decomposition of food particles in the mouth.
4.— ,, ,, putrescible organic matter.
5.— ,, is saturated with watery vapours.

Coal Combustion :

Carbon monoxide, dioxide and disulphide, Ammonium, Sulphide, Sulphur, Sulphur dioxide and Sulphuric Acid, Water, Soot and tarry products, added to the air.

Wood Combustion :—

Carbon monoxide and dioxide, Water and Sulphur compounds, added to the air.

Artificial Lights :—

1.—Temperature raised.

2.—Oxygen withdrawn.

3.—Moisture, Carbon monoxide and dioxide, Nitric and Nitrous Acids, Compounds of Ammonia, Sulphur and Carbon particles added to the air.

LIGHTING.

Method.	For Ordinary Room.	For School Room.
NATURAL. **By windows,** reaching as near to ceilings as possible. Made to open. Fitted with Blinds..	Not less than one-tenth of floor space.	Not less than one quarter to one-sixth of floor space. Glass plain, transparent. Height 4 ft. from floor to bottom of window. Light admitted from left side of scholars.

Method.	Advantages.	Disadvantages.
ARTIFICIAL. **Electric Light** formed by a thread of carbon or platinum made incandescent by an electric current.	No products of combustion. No CO_2 added to the air. No O abstracted. Light white, not yellow.	Cost prohibits general use. Light is dazzling, this objection overcome by using a shade.
Coal Gas formed by the destructive distillation of coal.	Fair light. Fairly cheap.	CO_2 and Sulphurous Acid added to the air (these, more or less, consumed by using incandescent burners, which have also the advantage of giving off less heat, less vitiation and drying of air). The air gets hot and dry. Gas may escape, foul the air, or cause explosion.
Paraffin, formed by the distillation of crude petroleum.	Can be used in Country districts where neither gas nor electric light is available. Fairly cheap. Soft mellow flame.	CO_2 and water vapour given off in burning. Flame hot, may cause headache. Light poor. Explosions may occur.

N.B.:—An ordinary gas burner fouls as much air as 5 or 6 men.
Incandescent, equals 4 men.
Paraffin, equals several men.
Electric, no fouling.

WATER.

Composition :—A chemical compound, consisting of Hydrogen 2 volumes, Oxygen 1 volume.

*****Uses :**—Assists in building up body tissues ; aids excretion of effete matters by skin, kidneys, lungs, intestines.

Helps in keeping body at uniform temperature ; cooking and cleansing purposes ; extinguishing fires, etc.

Sources :—

	Advantages	*Objections*
RAINFALL	Soft and good for washing purposes.	Gathers impurities in passing through the air. Uncertain fall.
RIVER ...	When flow is constant and free from town or other pollution, may be good.	May become polluted by sewage, refuse, agricultural land or manufactories.
LAKE ...	Ditto	May be fed by rivers or streams passing through cultivated land.
†SPRING...	Good.	May be loaded with dissolved minerals.
SURFACE	May be satisfactory if it is upland surface water away from dwellings and cultivated land.	Liable to pollution from drains, cesspools, cultivated land.
SHALLOW OR SUBSOIL	Ditto.	Ditto.
DEEP WELL	Very pure and palatable.	Hard.

MEMORY AID :—

* For drinking, cooking, cleansing, flushing, putting out fires, and manufacturing purposes.

† Spring water is rain water which has sunk through the soil until it has reached an impervious stratum, such as clay. It tends to run along the surface of this, and where the stratum appears at the surface, as on the side of a hill, the water issues as a spring.

Sources of Contamination :—

1.—ON GATHERING GROUNDS :—Cultivation of land—manure, Decaying vegetation, Droppings of cattle and other animals.

2.—IN RIVERS :—Sewage, Trade effluents, Drainage from manured land, Animals' solid refuse.

3.—SHALLOW WELLS :—Drainage and washings from surrounding surfaces of lands, Leakage from drains, cesspools, privies, middens ; Drainage from farm yards.

4.—DEEP WELLS :—Same as shallow, if well is not properly lined. Pollution by buckets of pumps used for drawing the water.

IMPURITIES MET WITH IN WATER.

GASES :—Carbonic acid, Sewer gas.

SUBSTANCES DISSOLVED :—Carbonate and Sulphate of Lime, Chloride of Lime, Common Salt, Epsom Salts and Glaubers' Salts, Iron and Lead, Nitrites and Nitrates.

SUBSTANCES IN SUSPENSION : — Mineral matter, Vegetable debris, Bacteria-germs of Enteric Fever, ~~Bacteria germs~~ of Diarrhœa, ~~Bacteria germs~~ of Dysentry and Cholera.

INTESTINAL PARASITES :—Tape worms, Round and Thread worms, Bacillus Coli.

STORAGE OF DOMESTIC SUPPLIES.

Tanks or Cisterns sometimes necessary, though not desirable, where supply is intermittent. These cisterns, when allowed, must fulfil the following requirements :—

1.—MATERIAL :—Galvanized iron or slate with cement joints.

2.—POSITION :—Accessible to admit of inspection and cleansing, shielded from the sun's rays, *covered and ventilated.*

3.—FITTINGS :—Overflow pipe carried through the nearest outside wall must not have any communication with any drain or soil pipe. Supply pipe for w.c. must not pass direct from the Cistern.

Objections to Cisterns :—

1.—Risk of contamination by dust, dead birds, mice, cockroaches.

2.—Less easily guarded against frost.

3.—Water less cool and less palatable in hot weather.

DISTRIBUTION (2 Systems).

Constant Supply :—The mains constantly charged with water under pressure.

Intermittent Supply :—The water being supplied a few hours a day.

The Two Supplies Compared :

Constant ;	*Intermittent ;*
No storage on premises, hence risk of cisterns avoided.	Storage necessary, with all the risks mentioned under cisterns.
Water is clear, cool, and sparkling.	Water loses its ærated character, becomes flat, insipid.
Supply is abundant, never failing, available in case of fire.	Not available in case of fire.
Induces greater cleanliness.	Coal gas, sewer gases or liquid filth liable to be drawn into the mains and service pipes, when empty.

Disadvantage :—
(*a*) Waste.
(*b*) More costly fittings.

Advantage :—
(*a*) Less waste.
(*b*) Less costly fittings.

A Degree of Hardness in Water is one grain of Carbonate of lime per gallon of water.

CLARK'S PROCESS FOR SOFTENING WATER.

Add one ounce of quicklime to 100 gallons of water for every degree of temporary hardness. The lime and Calcic bicarbonate form insoluble Calcic carbonate, and this carries down with it suspended matters.

Temporary hardness is due to Carbonates of Lime, Magnesia and Iron.

Permanent hardness is due to Sulphates of Lime, Magnesia and Iron.

Water is called temporarily hard because the hardness can be reduced by boiling, the CO_2 which holds the Carbonates in solution is driven off by boiling, and the lime, etc., are thrown down.

PURIFICATION OF WATER.

1.—**Filtration** by :

   (*a*) Filter beds (Public water supply)
   (*b*) Pasteur Chamberland Filter
   (*c*) Berkfeld Filter
   (*d*) Spongy iron Filter, etc.

2.—**Boiling.** This removes the temporary hardness of water by driving off CO_2, which keeps the Calcium Carbonate in solution. It also kills germs.

3.—**Exposure** to air in divided currents.

4.—**Distillation,** by boiling water and condensing steam.

5.—**Subsidence :** allowing water to stand for some time. This favours subsidence of heavy particles, and to some extent organisms.

DOMESTIC FILTERS.

1.—Pasteur Chamberland.

2.—Berkfeld.

3.—Silicated Carbon and Manganous Carbon Blocks.

4.—Spongy Iron.

5.—Animal Charcoal (objectionable).

WATER SUPPLY IN SCHOOLS.

Requirements :—

1.—Supply must be adequate and wholesome.

2.—Pipes protected from frost laid, and so fixed, that defects can be detected, and pollution avoided.

3.—Pipes and cisterns must have no communication with any w.c. or urinal.

4.—Storage cisterns covered, ventilated, and so placed and constructed that inspection and cleaning can be carried out.

5.—W.C.'s and urinals provided with service cisterns, ensuring a sufficient flush.

WATERS WHICH HAVE A SOLVENT ACTION UPON LEAD.

1.—Rain-water.

2.—Soft moorland, especially if they have an acid reaction, as peaty waters have.

Solvent Action Prevented by :—

1.—Adding lime to the water (2 to 3 grains to the gallon).

2.—Adding powdered charcoal or whitening (1½ grains to the gallon).

GOOD GEOLOGICAL WATER BEARING STRATA.

1.—Chalk.

2.—Oolite.

3.—Sandstone.

4.—Hastings sand.

5.—Now red, or conglomerate sandstone.

Amount of Water Required per Head :—

Daily allowance about 6 gallons :—1 gallon as water, tea, coffee, etc., or contained in solid food ; 5 gallons for cooking, personal ablution (including a bath).

Domestic purposes (house scrubbing, cleaning, laundry, w.c.'s), 12 gallons.

Street watering and fire extinguishing, 12 gallons.

Average daily requirement for all town purposes, 30 gallons per head.

DISEASES ASSOCIATED WITH THE USE OF IMPURE WATER.

1.—Cholera.
2.—Enteric Fever and Dysentery.
3.—Dyspepsia.
4.—Diarrhœa.
5.—Malaria.
6.—Goitre.
7.—Parasitic Diseases—the various Tapeworms, etc.
8.—Metallic Poisoning.

USES OF FOOD.

1.—To maintain the body temperature (by supplying combustible material, e.g., Carbon contained in fats).

2.—To supply energy necessary to carry on physical and mental functions (carbo-hydrates or sugars and starches consisting of C.H.O.).

3.—To repair and renew the wasted tissues of the body (Proteins or Nitrogenous substances, e.g., meat, fish, eggs, etc.).

4.—To supply material for growth (Proteids, etc.).

FOODS CLASSIFIED.

1.—**Proteins,** or Nitrogenous bodies, substances containing Nitrogen :—

Animal Proteins are found in meat, fish, eggs, in the form of albumen ; and in milk and cheese as casein.

Vegetable Proteins : gluten of wheat, and legumen of peas and beans.

Functions—(1) Build up the body (2) Repair tissue waste.

2.—**Fats,** containing Carbon, Hydrogen, and Oxygen :

Animal Fats : Butter, Cream, Cod-liver-oil.

Vegetable Fats : Cocoanut oil, Olive oil.

Functions—Maintain the body temperature by the heat produced from the carbon.

3.—**Carbo-Hydrates** or **Sugars** and **Starches** containing C.H. and O. :—

Grape Sugar.

Cane Sugar.

Starch found in potatoes, sago, tapioca, wheat, oats, barley, rice.

Functions—Producers of muscular and nervous energy.

4.—**Salts :**—

Organic found in lemons, oranges, grapes.

In-organic, common salt, carbonate of soda, carbonate of potassium.

5.—**Water,** found in all our food.

N.B.—Extractives, such as beef tea, chicken broth, are merely stimulants and restoratives ; they have no nutritive value.

COMPOSITION OF FOODS.

Bread :—(1) Carbo-hydrates (2) Proteins (3) Salts (4) Water (5) Fats.

Cheese :—Same as Bread, but NO CARBO-HYDRATES.

Cows' Milk :—Same as Cheese, but SUGAR (lactose) in addition.

Eggs, the white mostly albumen, the yoke albumen and fatty material, glucose, salts and water.

Margarine consists of clarified Ox fat, mixed with vegetable fats or oil, such as nut oil.

Tea, the most important constituents are—(1) Theine (2) A volatile oil (3) Tannin.

Action—Stimulant and restorative to nervous system. Taken in excess, it causes palpitation, sleeplessness, nervousness, indigestion (the latter due to tannin).

Coffee :—Important constituents are—(1) Caffeine (2) Volatile oil (3) Nitrogenous body (4) Astringent, like Tannin.

Action : Like tea.

DIET NECESSARY UNDER DIFFERENT CONDITIONS.

	Subsistence.	Ordinary Work.	Laborious Work.
	ounces.	ounces.	ounces.
Proteins	2·0	4·5	6·5
Fats	0·5	3·5	4·0
Carbo-hydrates...	12·0	14·0	17·0
Salts	0·5	1·0	1·3
TOTAL Water-free Food	15·0	23·0	28·8

FOOD SUITABLE FOR YOUNG CHILDREN AT SCHOOL.

1.—Milk, Porridge and Milk.
2.—Meat or Fresh Fish or Broth, Soups, Eggs.
3.—Cereals and Farinaceous Foods.
4.—Potatoes or Vegetables.
5.—Fruit, as Prunes, Apples, etc.
6.—Bread with meals, Butter, Margarine or Dripping.
7.—Syrup, Jam.
8.—Little Tea or Coffee—Cocoa made with milk is preferable.

MORE COMMON FOODS.

FOOD.	RELATIVE VALUE.	DIGESTIBILITY.
Beef	More nutritious than Mutton or Pork.	Not easily digested.
Veal	Less nutritious than Beef ...	Less difficult to digest.
Mutton	,, ,, ,, ,, ...	More easily digested.
Lamb	,, ,, ,, ,, ...	,, ,, ,,
Pork	,, ,, ,, ,, ...	Not easily digested.
Red Fish, i.e., Salmon.	,, ,, ,, ,, ...	Not easily digested, but more digestible than Meat.
White Fish, i.e., Whiting, Haddock, Sole and Turbot.	,, ,, ,, ,, ...	Most easily digested.
Cheese	Twice as nourishing as Meat of equal weight.	Not easily digested.

NOTE :—Margarine is equal in nutritive value to butter, and is a wholesome substitute for it.

Milk contains all the essential constituents of a perfect food for infants. For adults it contains relatively too much protein and fat, and too little carbo-hydrate.

COMMON ADULTERATIONS IN FOODS.

Milk :—(1) Water (2) Preservatives, as formalin (3) Borax (4) Salicylic Acid (5) Starch, flour, glycerine, gum.

Flour :—Alum, potatoes, rice and other grains.

Coffee :—Chicory, arrow root, and potato flour.

Tea :—Used leaves may be dried and mixed with gum and rolled. Foreign leaves are sometimes added.

Cocoa :—Sugar and cheaper starches.

Butter :—Margarine, colouring agents (Annato), formalin borax, salicylic acid.

PROCESSES EMPLOYED FOR PRESERVING FOOD.

(1) Drying (2) Freezing (3) Salting (4) Smoking (5) Sterilization and Sealing Hermetically (6) Protecting from the air by a covering.

Drying—meat, fish, fruit and vegetables are dried in the sun, or in a current of air.

Freezing prevents, or checks, the growth of bacteria.

Salting : the salt is not only antiseptic, but the saline solution removes the fluids in the tissues, and deposits salt and hardens them.

Smoking partly dries, and partly acts antiseptically.

Covering with Air-proof Substances, as fat, oil, sugar gelatine creasote.

Sterilization and **Sealing.**

FOOD STORAGE.

STORE IN :—

1.—**Clean Larder :**

- (*a*) Having a North aspect.
- (*b*) Good light and ventilation.
- (*c*) White-washed walls.
- (*d*) Windows open, or in place of them and door panels, perforated Zinc sheets.
- (*e*) Nothing else but food in it.
- (*f*) A covering of clean muslin for meat, milk, and fish.

2.—**Meat Safe :**

Placed away from drain outlet, ashpit, pail closet.

Failing proper storage, advise egg box :

- (*a*) Top removed.
- (*b*) Bottom fastened to wooden partition in Scullery.

COOKING

Objects :—

Renders food more palatable and more easily digested

Kills germs

Breaks up the different constituents

Aids the action of the gastric juice.

METHODS.

Boiling :—Place the meat in boiling water 10 minutes ; this coagulates the surface albumen, and prevents the escape of the juices. Lower the temperature to between 160 to 170 degrees Fah., allow to simmer till cooking is finished.

Roasting :—Place the meat before the open fire ; the surface albumen is coagulated. Remove further from the fire, and allow to cook gradually.

Stewing :—Cover the meat with water, allow to simmer by gentle heat ; the juices pass into the water, and a gravy is formed, the meat left being tender.

Grilling :—This done on a grid-iron. The effect is the same as roasting.

Broiling :—Like grilling, but more rapid.

Frying :—The meat is boiled in fat, or oil, instead of water. The meat is less digestible than when boiled or roasted.

EFFECT OF COOKING ON STARCH.

Dry Heat converts starch into a soluble form, and finally into dextrin.

Moist Heat causes the starch grains to swell, and later to burst their cellular envelopes.

DISEASES DUE TO IMPROPER FOOD.

Too Little :—Wasting, thirst, and failing strength.

Too Much :—Indigestion, Diarrhœa, Derangement of the Liver and Kidneys, Gout and Brights disease.

Impure or Improper :—

Scurvy, if vegetable acids and salts absent
Rickets, if lime salts deficient, or food too starchy for age
Diarrhœa and Food Poisoning, if food has undergone decomposition
Diarrhœa, Enteric, Cholera, Intestinal Parasites and Worms, if water contaminated
Scarlet Fever, Diphtheria, Tuberculosis, if milk affected.
Tape-worm, Trichina-spiralis and Tuberculosis, if meat affected.

HOW FOOD MAY BECOME CONTAMINATED

1.—Handling by infected persons

2.—Exposing to flies, dust, dried infected matter coughed up from the air passages

3.—Storing in receptacles unclean, or washed out with polluted water.

4.—Sewage pollution of waters in which shell fish exist, or water cress grows.

HOW PREVENTED

1.—Scrupulous cleanliness

2.—Prohibit carriers from handling the milk or food

3.—Clean storage, receptacles properly covered

4.—Pasteurize or boil milk.

HOW TO DETECT DECOMPOSITION IN TINNED FOODS

1.—The tops and bottoms of the tins, previously slightly depressed on the outside, are flat, owing to the accumulation of the gases of putrefaction.

2.—The tin, when struck, gives out a hollow or drum-like sound.

CHARACTERISTICS OF GOOD MEAT

Deep red, marbled, not unduly moist, no appreciable smell, resistent throughout, fat firm, not too yellow.

PROPER FOOD FOR THE BABY

Breast Feeding :—This is the best for the baby until the age of 9 months is reached. The infant should be placed to the breast from 3 to 4 hours after birth, and afterwards every 2 hours by day, and every 4 hours by night until the 3rd month of his age. After 3 months, the baby must be fed every 3 hours by day, and only once during the night.

Bottle Feeding :—Only justifiable if either of the following conditions is present :—

Mother :

1.—Physical weakness
2.—Marked Anæmia
3.—Consumption
4.—Syphilis
5.—Infectious disease
6.—Heart or Kidney disease
7.—Depressed, or cracked, nipples.

Child :

1.—Debility marked
2.—Pre-maturity
3.—Hare lip
4.—Cleft palate
5.—Facial Paralysis
6.—Thrush.

ADVANTAGES OF BREAST FEEDING OVER ARTIFICIAL

1.—Baby gets food provided by nature, therefore better.
2.—Human milk is free from germs and their products.
3.—Baby suffers less from digestive troubles, such as wind, colic, diarrhœa.
4.—Less trouble, and cheaper.

COW'S MILK, DILUTED AS FOLLOWS, IS THE BEST SUBSTITUTE FOR HUMAN MILK

	Proportion of Milk to Water	
Age	**Milk**	**Water**
During 1st month ...	1 Part.	3 Parts.
,, 2nd month ...	1 Part.	2 Parts.
,, 3rd month ...	1 Part.	2 Parts.
,, 4th month ...	1 Part.	1 Part.
,, 5th month ...	2 Parts.	1 Part.
,, 6th month ...	2 Parts.	1 Part.
From 7th to 9th month	3 Parts.	1 Part.
From 9th to 12th month	All Milk.	

Add about one teaspoonful of milk sugar, and about a dessert-spoonful of fresh cream to every 4 ounces of diluted milk.

AMOUNT TO EACH FEED

Age	Quantity
1st Week	1 ounce.
2nd to 6th week	1½ to 2 ounces.
6th week to 3 months	3 to 4 ounces.
3 months to 6 months	4 to 6 ,,
6 months to 8 months	6 to 7 ,,
8 months to 12 months	7 to 8 ,,

HOW DOES COWS MILK DIFFER FROM HUMAN MILK ?

1.—**Cows Milk** contains more proteins, slightly less fat, and considerably less sugar, a larger quantity of albumen, which is coaguable by an acid, is faintly acid, and contains bacteria.

2.—**Human Milk** is alkaline, and contains no bacteria.

BOILED MILK

Boil Always when :—

1.—Cleanliness is in doubt

2.—Milk has to be stored, and there is no provision for keeping it cool

3.—Milk is sold in slums and poorer areas of towns, especially when infectious disease is prevalent.

Don't Boil if satisfied that :—

1.—None of the above conditions exist

2.—Milk will be consumed shortly after leaving the cow.

BOILING	OBJECTIONS	PASTEURISING	OBJECTIONS
For half an hour.	Taste and colour of milk altered less agreeable flavour Fat melts curds are tough and indigestible. Part of the Protein is coagulated, forming a scum Digestive ferments are destroyed.	Milk heated for 20 minutes at a temperature of 70° C, and rapidly cooled.	Some germs escape destruction Spores of germs survive Milk soon turns.

If either of the above courses is adopted, the milk must be placed at once in a clean receptacle, protected from flies, dust, and other contaminations by a muslin cover, and kept in a cool place.

DUMMIES OR COMFORTERS

(Artificial teats composed of rubber.)

Bad Effects :—

1.—Get contaminated with dirt, causing sickness and diarrhœa.

2.—Deform the mouth, and lead to mouth breathing, adenoids, enlarged tonsils.

INFANTS' FOOD

FOOD	COMPOSITION	AMOUNT REQUIRED
Allenbury's No. 1	Desiccated cows' milk, with the excess of casein removed and milk, sugar, cream and vegetable albumin added (the mixture is starch free)	Age 3 months :—Half an ounce in 3 ozs. of water.
Allenbury's No. 2	Ditto. ditto. Malted flour (starch free)	Age 6 months :—1 ounce in 6 ounces of water.
Allenbury's Malted Food.	Wheat, flour, and malt (some unaltered starch).	Age above 6 months :—1 tablespoonful, 3 tablespoonfuls cold water, these are mixed and half pint boiling milk and water (equal parts) are added.
Horlick's Malted Milk	Desiccated milk, wheat flour, barley malt, and bicarbonate of soda (starch free).	Age 3 months :—3 tablespoonfuls, 4 ozs. water.
Mellin's Food	Desiccated malt extract. Starch completely transformed.	Age under 3 months :—Half teaspoonful, quarter pint milk, quarter pint water.
Benger's Food	Wheat, flour, and pancreatic ferment. Prepared as directed with milk, the starch is converted into soluble forms.	1 Tablespoonful, 4 tablespoons cold milk, mix and add half pint of boiling milk and water.
Savory & Moore's Food	Wheat flour and malt. Prepared as directed, the starch is converted into soluble forms.	1 to 2 tablespoonfuls, 2 or 3 tablespoonfuls cold milk, mix and add one-third pint boiling water.
Ridges & Neaves' Food Robinson's Patent Barley, and Groats.	In these, the starch is not pre-digested.	

N.B.—An infant under 7 months old cannot convert starch into sugar. Patent foods containing unconverted starch should, therefore, not be given before that age.

ALCOHOL ITS USES AND ABUSES

Moderate Doses (1 to $1\frac{1}{2}$ ounces daily) :—

1.—Aids digestion and assimilation
2.—Acts as a food, supplying heat and energy by its oxidation
3.—Increases the number and force of the heart's beats, and dilates the surface blood vessels, causing more heat to be given off.

Excessive Doses Long Continued :—

1.—Cause degenerative changes in the stomach, liver, kidneys, lungs, brain, and blood vessels
2.—Gin drinkers liver, then dropsy, hæmorrhage.
3.—Very dangerous to persons exposed to great heat, or great cold.

CLOTHING

Wool is obtained from sheep, goats, camels, and other animals, and is the best material for underclothing.

Properties :

1.—Conducts heat badly
2.—Absorbs water and moisture readily
3.—Gives off heat slowly
4.—Produces less cooling by evaporation.

Its Non-Conducting Properties are due to :

1.—The wool fibres
2.—The air within its interstices.

Disadvantages :

It hardens and shrinks on washing.

Cotton is the downy hair of the seeds of plants belonging to the family of Gossypium.

Properties :

1.—Rapidly conducts heat away
2.—Absorbs moisture badly
3.—Moisture is re-evaporated, causing a chill to the surface of the body
4.—Does not shrink on washing, and is durable.

Cellular Cotton is warmer, because the air which fills its interspaces conducts heat badly.

Linen is a good conductor of heat, and a bad absorber of moisture.

Silk—Produced by the caterpillar or silk worm.

Properties :

1.—Conducts heat badly
2.—Absorbs moisture, but less readily than wool
3.—Non-conductor of electricity
4.—Shrinks less than wool.

Flax is a fibre obtained from the stalks of a plant which grows largely in Ireland and Russia. It is used chiefly for the manufacture of linen.

Boys		**Girls**	
SUMMER	**WINTER**	**SUMMER**	**WINTER**
Head Gear.			
Light straw hat.	Cloth cap	Light straw hat	Felt hat
Body Clothing.			
Thin woollen combination or thin woollen vest.	Thick woollen combination	Thin woollen combinations	Thick woollen combinations
Thin serge knickerbockers.	Thick serge knickerbockers	Thin serge knickerbockers	Thick serge knickerbockers
Woollen jersey.	Woollen vest.	Under bodice of Calico	Under woollen bodice, provided with sleeves
Foot Gear.			
Shoes.	Boots	Shoes	Boots
Thin woollen stockings.	Thick woollen stockings	Thin Cashmere stockings.	Thick Cashmere stockings.

Note :—The head dress must be light, porous, and free from tight rim, which may, by pressing on the scalp, obstruct the circulation of blood, and so induce baldness.
The neck must be free from constricting bands.
The arms, chest, and legs require special protection.
Petticoats and dresses should be suspended by braces.
Suspenders should be used in place of garters, and
Tight lacing strictly avoided.

Boots should be :—

1.—Correct size ; if too large or too small, Corns are caused, if tight, bunions and ingrowing toe nails result.

2.—Square in shape.

3.—Inner side of boot straight, not curved. Pointed toes bend the big toe inwards, and displace the others.

4.—Low broad heels.

BED AND BED-CLOTHING

The Bedstead, made of iron (never wood), free from drapery, should be placed well away from the wall to admit of free circulation of air all round it, and be provided with wire springs.

Mattress of horse hair or pine fibre.

Pillows, Bolsters, and Mattresses should be enclosed in clean, washable and removable material.

Blankets, light, white, warm, woollen.

NOTE :—Feather beds are insanitary.

Occupant of bed should sleep between sheets, never between blankets, unless ordered to do so by Doctor.

Two hours at least should elapse between rising and making the bed ; the bed clothes in the interval being thrown over the rails to air, and the windows kept open.

CONDITIONS OF SOIL AFFECTING HEALTH

Soils Classified.

Good		Bad
Gravel	Porous	Clay retains moisture, difficult to drain
Sand		Low-lying land because ground-water is near surface.
Sandstone		Made ground because organic matter is increased.

Chalk is porous, but does not retain heat.

Ground Water is rain water which trickles through ground till it reaches impermeable stratum.

Ground Air : Air which fills spaces between soil particles above ground water. It differs from ordinary air in that it contains more CO_2 and other organic gases, less O and more germs.

It becomes impure by formation of CO_2 and other gases owing to germs decomposing animal and vegetable refuse.

Movements of Ground Air : After heavy rains it is forced from soil, and in the absence of certain precautions, may enter houses. In winter, ice may prevent this, but heat of house is apt to melt ice, and so release ground air.

Remedy : Made soil should not be built on for two or three years, the period necessary for its purification. Site should be sealed with cement or asphalt.

ASPECT OF HOUSE

Rooms used in early part of day (morning), including bed-rooms, should face South-East. Rooms used later in day should face South-West.

ELEVATION

High, this will give fresh air and dry soil. Slight slope in all directions. Protect from Cold North and East winds by planting trees at distance, which will not cause stagnation of air.

Houses situated at foot of slopes should be provided with efficient subsoil drainage.

DAMP

Causes.	**Prevention.**
1.—Defective site	Chose a dry site with a porous soil
2.—High level ground water	Drain subsoil, concrete site
3.—Defective foundations	Lay a foundation of concrete
4.—Ascent of moisture by capillary attraction	Insert damp-proof course (slate, sheet lead, asphalt) 6 inches above the ground level
5.—Porous bricks and bad mortar	Coat walls with Portland cement
6.—Defective roof	Repair or renew roof, using good material and workmanship
7.—Defective roof gutters, & damaged water pipes.	Repair or renew and fix pipes clear of the walls

REMOVAL OF WASTE AND IMPURITIES

Impurity or Waste.	**Method of Removal.**
Carbonic Acid and organic debris from the lungs	Efficient Ventilation
Dirt, scales and effete material from the skin	Regular washing with soap and water
Urine and fæces	(*a*) Water carriage system (*b*) Conservancy (dry earth) systems
Kitchen Refuse :— Animal & Vegetable matter Meat, fish, cabbage and tea leaves, potato peels, Scraps of food.	After drying, burn on fire Store waste which cannot be burnt in small dustbin of galvanized iron, with a close fitting cover to exclude moisture, and emptied bi-weekly at least
Slop Water :— (*a*) Waste from cooking (*b*) Waste from baths (*c*) Waste from laundry (*d*) Waste from house cleaning.	By pipes passing through the external wall, and made to discharge over a syphon gully trap connected with the drains
Rainwater	By pipes discharging over a stoneware syphon gully, provided with an iron grating.

SOIL PIPES

A Soil Pipe brings the contents from the w.c. and urinal to the house drain, and by its prolongation upwards also serves as a ventilator.

Position : Outside the wall, carried up beyond the eaves of the roof, not less than 3 feet above any window, and 6 feet from any chimney, the outlet being covered by wire netting to prevent obstruction by birds' nests, etc.

Material : Drawn lead, or iron coated inside and out by Angus Smith's solution, to prevent rust.

Size : 10 feet lengths, 4 inches in diameter.

Joints : " Wiped " (soldered).

WATER CLOSETS

Position, etc. : Against an external wall, or in projecting tower, through ventilation between it and the house, window not less than 2 sq. ft. in area.

Types :—

Wash Down (the best), consisting of an inverted stoneware cone connected below with a siphon trap, and provided with a flushing rim.

Advantages : Excrement drops into the trap water, no fouling of basin's sides.

Wash Out (insanitary).

Valve :

Objections : Complicated structure, expensive, liable to get out of order.

Plug.

Trough.

Note : **The Pan Closet** (highly objectionable), consists of a funnel-shaped earthenware receptacle, the smaller end of which is closed by a copper pan containing water ; a cast iron box rests on the floor; into which pan contents are thrown, a short pipe with a lead trap below the floor.

Objections :

Filthy receiver cannot be cleaned, foul air enters room when pan is tilted, trap contents emit obnoxious gases.

Waste Water Preventer : Cistern holding usually 3 gallons of water, emptying on the syphon system.

EARTH AND OTHER DRY CLOSET SYSTEMS

SYSTEM	ADVANTAGES	DISADVANTAGES
Moules Dry Earth. The closets are filled with pans, dry earth, 1½ lbs., being added to each stool.	Cheaper in original cost than w.c.'s Requires less repair Not injured by frost Saves water.	Trouble of obtaining suitable earth Cost of transport Difficulty of securing proper attention Small commercial value of product
Goux Excreta collected in tubs lined with dry absorbents ; stable litter, sawdust, etc., being placed on the bottom.	Absorbents render fæcal matter drier, and less offensive.	Small commercial value of product Expense of removal
Pails containing absorbent or deodoriser, and removed by the Sanitary Authority.	Contents easily removed. Extreme simplicity.	Urine and fæces left to themselves in the pails rapidly decompose Smells arise if pail contents are not kept dry by the addition of ashes, earth, etc.

PRIVIES

Requirements :—

1.—At least 6 feet from any dwelling
2.—At least 50 feet from water supply
3.—Readily accessible for scavenger
4.—Roofed
5.—Ventilated near the top
6.—Paved with hard tiles, having an inclination towards the privy door
7.—Impermeable walls
8.—Hinged seat.

LATRINES FOR SCHOOLS

Latrines means a grouped set of closets, water or dry earth. The best closets for schools are the short hopper or pedestal wash down, automatically flushed.

The one in frequent use is the Stoneware Trough, a series of closets provided with a common flush.

Requirements :—

Position, except for women teachers, outside the building, separate for the sexes

Approaching to w.c.'s, separate for the sexes
Size not less than 2 ft. 3 ins., or more than 3 ft., fully lighted overhead

Door for each

One seat for each.

Number :—

	For Girls	For Boys	For Infants
Under 30 children ...	2	1	2
,, 50 ,, ...	3	2	3
,, 70 ,, ...	4	2	3
,, 100 ,, ...	5	3	4
,, 150 ,, ...	6	4	5
,, 300 ,, ...	7	4	6
,, 300 ,, ...	8	5	7

Urinals :—

Sides and Backs—Slate or Porcelain.

Floor—Smooth cement, sloping to a channel. The channel having an inclination towards one end and terminating in a trapped gully.

Efficiently flushed.

ASHPITS

A fixed receptacle, sometimes used for house refuse. It should be :—

1.—On ground level

2.—Capable of holding a week's refuse

3.—Six feet from any house, and have

4.—Door in one side

5.—Hinged cover

6.—Smooth lining of impenetrable cement.

A Drain is the drain of one building, or premises, in one occupation, leading into a sewer or cesspit.

A Sewer is the channel receiving the drains of two or more houses or separate premises.

Combined System of Sewerage—The surface drainage and water carried off by the same channels as the sewage.

Separate System—Separate channels provided to carry off the rainfall.

House Drains receive ordinarily the discharge from water closets, rain water and waste from baths and sinks.

Their Use—To carry away to sewer or cesspit waste product that can be removed by water.

Material of House Drains—Earthenware or iron.

Size of House Drains—6 inches **Branch Drains** rarely exceed 4 inches in diameter.

How Laid ? In straight lines, each pipe being placed with the spigot directed towards the flow of sewage, on concrete not less than six inches in depth, with a fall for four inch drains of 1 in 40, for six inch drains of 1 in 60, and eight inch drains of 1 in 80.

Material of Sewers—Up to 18 inches in diameter, earthenware, cement and concrete. Up to 6 inches in diameter, cast iron pipes, coated with Angus Smith's preservative to prevent erosion.

Shape of Sewers—Circular in section.

Egg-shaped Sewer Preferable—If fluctuations in the amount of sewage are great.

How Laid—On a sound foundation, accessible by manholes, in straight lines from hole to hole. Junctions and curves made at a manhole by open half pipes.

Velocity of Flow—Never less than 2 feet per second.

Ventilation of Sewers—By (1) Surface gratings; and (2) upcast shafts carried up houses or trees.

Join Drains—Earthenware pipes with Portland cement. Iron pipes with molten lead properly caulked.

Drain Passing beneath House should be completely embedded in, and covered with concrete at least 6 inches thick all round.

TRAPS

A Trap is a dip or bend in a pipe, which allows water, etc., to pass but prevents foul air or gases from entering the house.

Essentials of a Good Trap : Must be—

1.—Self cleansing
2.—Properly laid
3.—Outlet lower than inlet
4.—Water seal never less than 2 to 3 inches
5.—Not liable to be forced by the pressure of sewer gas.

Types :—

1.—**Siphon** (the best) is a curved pipe shaped like S ; the curve contains water. Antisiphonage pipes should be provided in house where there are traps one above the other on different floors, otherwise suction of one may unseal the other.

2.—**Buchans'** has a fresh air inlet, also an opening beyond the water seal for cleansing.

3.—**Anti-D,** a bad siphon. The calibre is diminished in the bent portion. It assists in preventing siphonage.

4.—**D** is objectionable, because it is not self-cleansing, and leaks may occur from corrosion of lead.

5.—**Bell** is objectionable, because :
  (*a*) Seal is small
  (*b*) Obstruction by mud often occurs
  (*c*) Bell easily removed, and trap no longer exists.

6.—**Grease** (Stoneware Siphon) for Kitchen sinks.

A Seal is the depth between the surface of the water and the bottom of the lip of the trap. The lip is that portion of the trap which projects into the water.

Seal may become unsealed by :—

1.—Suction by siphon action (obviated by antisiphonage pipe)
2.—Evaporation
3.—Pressure of sewer air.

CLEANING, SWEEPING, AND DUSTING

Open windows
Move furniture to middle of room
Place articles, etc., on table and cover all with sheet
Shake curtains to remove dust, and pin them aside
Sprinkle tea leaves or damp sawdust on floor to lay dust

Dust with damp duster.

Sweep by short strokes first the sides, then after. replacing furniture, sweep middle working towards door
Burn all dust collected

Scrub early in day, and only when dust has been removed.

MANAGEMENT OF CASES OF CONSUMPTION IN THE HOUSE

1.—**Rooms** occupied by patient :

1.—Must be kept scrupulously clean

2.—Moist dusting and sweeping employed

3.—Unnecessary furniture, hangings, damp rooms and ground floor avoided.

4.—Windows open day and night

5.—Everything likely to obstruct entrance of sunlight and ventilation removed.

2.—**Patient** should :

Sleep alone
Never kiss, or be kissed
Never swallow his sputum
Expectorate into a vessel containing Carbolic Acid (1 in 20) ; which should be frequently emptied down w.c., and vessel afterwards cleansed with boiling water

If rag or paper used to spit in, these should be burnt

Keep skin clean by frequent bathing

3.—**Clothing** should be light, loose and warm

4.—**Diet** should be simple, wholesome and abundant.

N.B.—Consumptive mother should not suckle her child.

MICRO-ORGANISMS IN RELATION TO DISEASE

Disease is caused by the presence of germs, which can be seen only by the microscope :—

They are called :—

Bacilli, if rod-shaped
Vibrios, if curved
Cocci, if round or oval

Streptococci, if cocci are arranged like a string of beads

Staphylococci, if cocci are arranged like a bunch of grapes.

Modes of Attack :—

Germs may get into the body :

1.—By swallowing infected water, food stuffs, e.g., Enteric Fever, Cholera, Dysentry, Diarrhœa.

2.—By inhalation (air), e.g., Pneumonia, Diphtheria, Measles, Small-pox, Tuberculosis.

3.—By cut or abrasion of skin, e.g., Plague from bite of rat, flea, Lockjaw from soil containing the tetanus bacillus contaminating the wound, Yellow Fever and Malaria from bites of different species of mosquitoes.

BODY RESISTANCE

Some individuals are more susceptible to certain diseases than others—children "catch" infectious diseases more readily than adults—the white man is more liable to contract yellow fever than the negro. Anything which lowers body vitality, such as fatigue, chill, bad hygienic surroundings, improper or insufficient food, increases the liability to catch disease. Germs on entering the body have to contend with leucocytes (white corpuscles) and other substances, which devour them, and the secretions of the leucocytes which neutralize the secretions of the germs.

If the leucocytes are sufficient in quantity and quality, the disease is arrested ; if the germs predominate, and are stronger, the disease will develop.

Immunity is insusceptibility to a given disease. It is called :—

1.—**Natural,** when persons exposed to the same infection escape the disease, whilst others get it.

2.—**Acquired,** when persons have been rendered immune by—

(*a*) A previous attack of the same disease

(*b*) Vaccination or inoculation, e.g., Vaccination for Small-pox, Anti-Enteric inoculation for Typhoid Fever, etc.

COMPULSORILY NOTIFIABLE INFECTIOUS DISEASES.

Plague, Small-pox, Diphtheria (including Membranous Croup), Enteric (Typhoid), Puerperal, Typhus, Relapsing, Continued and Scarlet Fevers, Cholera, Cerebro-spinal Meningitis, Acute Poliomyelitis, Erysipelas, Ophthalmia Neonatorum, Tuberculosis, Measles.

DISEASE	CHIEF SIGNS OR SYMPTOMS	HOW SPREAD	HOW SPREAD PREVENTED	EXCLUSION FROM SCHOOL (period)
Diphtheria	Malaise Headache Sore throat White patches on tonsils Glands of neck enlarged	Contact, secretions from nose, mouth or throat of infected person, air, milk, clothes, pencils, book domestic pets.	Exclude the infected, swab and exclude contacts, forbid exchanges at school, discourage fondling of animals.	Till two successive negative cultures have been obtained.
Small-pox.	Shivering Vomiting Headache Backache Small red spots on third day about forehead, face wrists Spots become blisters, then pustules, and finally scabs, leaving pitted scars.	Contact, secretions from nose, mouth, contents of pustules, air, clothes.	Isolate infected, isolate and vaccinate contacts, re-vaccinate all others, keep under special observation vagrants, etc.	When scabs have disappeared.
Scarlet Fever.	Malaise Headache Vomiting Sore throat Rash, red punctiform on 2nd day Peeling lasting usually 6 weeks	Contact, discharges from ear, nose, throat, scales of skin, air, milk, Bedding, Clothes.	Isolate infected, anoint the skin with Eucalyptus, disinfect bedding, and clothes, boil milk; look for sore throats in schools.	Not less than six weeks, and then only if peeling is complete and discharges have ceased.

Disease	Chief Signs or Symptoms	How Spread	How Spread Prevented	Exclusion from School (Period).
Measles.	Shivering Sneezing Coughing Running at eyes and nose, Rash, red blotchy on 4th day on swollen face	Contact discharges from ear, nose, throat scabs of skin.	Isolate infected exclude from school Infant contacts and older children who have not had Measles	Not less than four weeks, and then only if no peeling present and discharges have ceased.
German Measles	Like Measles, but fever and catarrh slight, smaller, paler colour of spots.	Like Measles.	Like Measles.	Three weeks.
Chicken-pox.	Feverish Fretful Vomiting Small red spots on 1st day in successive crops, become blisters, then pustules, and finally scabs, leaving pitted scars.	Contact Clothes Bedding	Isolate infected	When scabs have disappeared.
Enteric Fever	Headache Backache Pains in limbs Languor Loss of appetite, Diarrhœa or constipation, Rose-coloured spots between 7th and 12th day, Staircase temperature.	Contact, swallowing infected water, milk, watercress, shell-fish, inhaling dust of dried dejecta fœces.	Isolate infected and "Carriers." Disinfect discharges, soiled clothing, and attendants hands.	When completely restored to health.

DISEASE	CHIEF SIGNS OR SYMPTOMS	HOW SPREAD	HOW SPREAD PREVENTED	EXCLUSION FROM SCHOOL (Period).
Whooping Cough	Slight fever Sneezing Running at eyes and nose Cough—whoop Vomiting.	Contact, clothes Bedding Handkerchiefs School attendance.	Isolate infected, watch contacts, exclude from school those with a cold during an epidemic, disinfect discharges from air passages, bedding, clothes, etc.	Not less than two months, then only if neither Cough nor Vomiting present.
Mumps	Slight Fever Headache Vomiting Pain Swelling below one ear extends to other side, forming a Collar, Difficulty in opening mouth and swallowing.	Contact, breath of infected patient.	Isolate infected.	Four weeks.

PUERPERAL FEVER

(Fever occurring in a Puerperal woman, due to sepsis).

Causes :—

1.—Germs introduced into genital passage by attendant, patient, or unclean instruments

2.—Insanitary surroundings

3.—Retained placenta, membranes, clots.

Signs and Symptoms :—

Rigors
Sweating
Fever raised
Pulse increased
Headache
Thirst
Foul smelling discharges from vagina.

Prevention :—

Attendant—

1.—Must observe scrupulous cleanliness of person, bag, contents, and dwelling

2.—Wear clean and washable dress

3.—Keep nails short and free from dirt

4.—Abstain from attending cases of labour if she herself—
  (*a*) Is suffering from any septic condition
  (*b*) Has been attending a case of puerperal fever or any other infectious disease, until disinfection of clothing, etc., has been carried out and Local Authorities approval obtained

5.—Cleanse and disinfect hands and arms before examining patient such examinations to be made only when absolutely necessary.

Patient—

1.—At commencement of labour should put on clean nightdress, and lie on clean sheet

2.—Have external parts washed with antiseptic solution (perchloride of mercury 1 in 1,000) before and after labour

3.—Be given vaginal douche only when ordered by Doctor.

PERIOD OF INCUBATION.

This is the time that elapses between the entrance of germs into the body, and the manifestation of symptoms of the disease :—

Scarlet Fever	1 to 6 days
Diphtheria	2 to 8 days
Enteric Fever	8 to 14 days
Measles and Chicken-pox	10 to 14 days
German Measles	6 to 14 days
Whooping Cough ...	7 to 14 days
Small-pox	12 to 14 days
Mumps	10 to 21 days

ISOLATION OF INFECTIOUS PERSONS,

Two Courses.

1.—**Hospital Isolation,** preferable.

2.—**Home Isolation,** poor substitute.

(*a*) Select room at top of house ; remove unnecessary furniture and drapery
(*b*) Ensure free ventilation and warmth by open fire
(*c*) Cover door with sheet moistened with Carbolic acid (doubtful value)
(*d*) Nurse to devote herself to patient wear washable dress wash her hands and face, and change her clothing before leaving house
(*e*) No visitors
(*f*) Keep patient's feeding utensils separate
(*g*) Disinfect all articles before removing from room
(*h*) Burn dust from room, and discharges from patient
(*i*) Disinfect urine and fæces before removal from room.

DISINFECTION AND DISINFECTANTS.

Disinfectant, an agent which destroys germs.

Methods :—

1.—Sunshine and fresh air.

2.—Heat :

(*a*) Dry Heat
(*b*) Steam : (1) Saturated when generated under pressure, and in contact with the water which generates it. (2) Superheated, when heated beyond its temperature by coming in contact with a surface hotter than itself.
(*c*) Boiling.

3.—Chemical Substances, as :

Carbolic Acid, 1 in 20

Corrosive Sublimate, 1 in 1,000

Chlorine produced by adding dilute Sulphuric acid to Chloride of Lime

Chloride of Lime, 1 in 100

Cyllin, 1 in 50

Izal, 1 in 200

Sulphur Dioxide, burning 4 lbs. of Sulphur for every 1,000 cubic feet of space.

Formalin :—

(*a*) Liquid as spray

(*b*) Vapour produced by heating Formalin tabloids in Alformant Lamp (25 tabloids for every 1,000 cubic feet of space).

Steam Disinfects—By parting with its latent heat ; as the steam condenses on the articles, a partial vacuum is created, into this vacuum more steam passes, and the deepest recesses are finally penetrated.

	Advantages.	Disadvantages.
Steam ...	Power to penetrate bulky articles (mattresses, pillows, etc.) Kills bacilli and spores quickly.	Not suitable for leather articles, e.g., Boots.
Dry Hot Air	Suitable for leather articles india-rubber, fur, books.	Has not the same penetrating power as steam. May scorch certain fabrics, change their colour, and cause them to shrink. Albuminous stains become fixed.

To Disinfect :—

1.—A Room—

Remove and disinfect by steam everything suitable for such treatment

Close all openings

Spray room with Formalin solution, or

Expose room to Formalin vapour generated by burning Formalin tabloids (25 for every 1,000 cubic feet of space) in an Alformant Lamp

Leave for 6 hours, then open doors and windows.

2.—Excreta—

Excreta and discharges are received into vessels containing Carbolic acid solution (1 in 20), to which more acid should be added before finally disposing of them.

3.—Clothing and Bedding—

Burn all of little value

Boil small things for an hour

Expose large things to steam in proper disinfector

Failing proper apparatus, soak in Carbolic acid (1 in 20) or Izal 1 in 200 for 12 hours, boil and wash.

4.—Mattresses, Bolsters and Pillows—

Spray with Formalin solution, place in disinfected sheet, and expose to steam.

5.—Leather Articles (Boots, etc.)—

Spray with Formalin solution, then expose to air.

6.—Books—

Burn whenever possible ; otherwise suspend on lines, with leaves separated, and expose to Formalin in air-tight chamber.

PARASITIC DISEASES.

Vegetable Parasites, e.g.—ringworms, favus, chloasma, thrush.

Animal Parasites, e.g.—scabies, lice, bugs, fleas, tapeworms, etc.

DISEASE.	SIGN.	TREATMENT.
Ringworms. Cause :— Tricophyton tonsurans fungus. Spread :— By contact of heads By hats By caps By clothing By towels.	SCALP—Round, raised, red patches, with scurfy surface Bent, brittle, short, dry hairs. BODY — Round, red, scaly, itchy patches.	Forbid exchange of hats and caps in Schools Exclude from School Doctor would probably recommend X-ray treatment Applications of Iodine, corrosive sublimate.
Favus. Cause :— Achorion fungus. Spread :— By direct contact By animals (dog).	Sulphur yellow cups, containing yellow crusts, having a mouse-like odour ; a brittle hair sticks out of the crust.	Exclude from School Extract affected hairs Cover crusts with starch and boracic poultice Then Iodine or other application, as ordered by Doctor.
Chloasma. Cause :— Micro-sporon fur-fur fungus.	Fawn-coloured patches, usually seen on front of chest, and root of neck.	Liberal use of soap and water.
Thrush. Cause :— Oidium Albicans mould. Occurs in weakly hand-fed children, or those suffering from diarrhœa. Dirty tube or bottle	Round, raised white patches on tongue, extending to cheeks.	Suitable food Cleanse mouth before and after each feed Apply glycerine and borax Keep mother's nipples clean
Impetigo. Cause :— Vermin Dirt Neglect.	Impetigo Capitis : Itching Scratching Pus Infection ; Thick yellowish crusts Mat hairs together. Impetigo Contagiosum : Small blisters on face, chin, near mouth, become yellow, dry up and form yellow crusts.	Exclude from School Destroy Vermin Apply dilute precipitate ointment after removal of scabs.

DISEASE.	SIGNS.	TREATMENT.
Itch. Cause :— Insect-Acarus Scabiei.	Itching, scratching, Pus infection, Itching worse when warm in bed, Female burrows in the skin (often between the fingers, front of wrist, groin), there lays her eggs, Burrow seen as dark dotted line.	Exclude from School Change clothing, and bake before wearing again Apply sulphur or storax ointment Give sulphur baths
Lice (3 kinds). 1.—Head louse 2.—Body louse 3.—Louse of Pubic region.	Itching, Scratching Pus infection Glands enlarged, and Nits are seen (in case of head).	Keep hair short Cut away hairs matted Wash with soft soap and water. Apply paraffin, warning against fire or unprotected light. Use fine tooth comb. Other applications are : Stavesacre ointment White precipitate ointment. For Body Lice :— Change clothing & bake before wearing again ; Apply white precipitate or stavesacre ointment.

Other Parasites include :—

BUGS

FLEAS

TAPEWORMS
(*a*) Tænia Solium, from measly pork
(*b*) Tænia Medio Canellata, from measly beef
(*c*) Tænia Bothriocephalus latus, from fish (pike).

THREAD-WORMS, from imperfectly cooked or raw vegetables

TRICHINA SPIRALIS, from pork

ROUND WORMS, etc.

BITE FROM VENOMOUS SNAKE.

Rub in powdered Potassium Permanganate, and inject under skin in neighbourhood of wound, a solution of Potassium Permanganate.

RABIES OR DOG MADNESS.

Signs and Symptoms :—

1.—Changed manner and habits of dog.
2.—Sometimes affectionate, at other times snaps at you.
3.—Avoids light (hides in dark places).
4.—Gnaws and eats indigestible substances.
5.—Howls in a peculiar way.
6.—Has difficulty in swallowing.

Treatment as † (page 65) Send patient to Pasteur Institute.

N.B. :—Chain up dog till seen by a Veterinary Surgeon.

STINGS OF BEES, WASPS AND HORNETS.

Treatment :—

Squeeze in order to remove Sting by pressing the barrel of a key over the spot

Apply an Alkaline solution, such as liquid Ammonia or Washing soda. These neutralize the Formic acid, which is the cause of pain.

CUTS.

Treatment :—

If small, wash with soap and water together with the surrounding skin. Apply Antiseptic cyanide gauze and bandage. If gauze not available, use clean linen rag, or boracic lint

If cut gapes, Doctor will stitch, to promote rapid healing

If cut bleeds severely, apply pad of gauze, lint, or clean linen rag, and bandage firmly. Send for Doctor.

Poisoned Cut.—Send for Doctor, who usually advises repeated immersion of the part in hot water, followed by fomentations.

CHOKING.

Choking is caused by anything obstructing the breathing, such as pieces of meat or bone, coins, false teeth or other body lodging over entrance to windpipe in act of swallowing.

Treatment :—

Forcibly open mouth, pass forefinger to back of throat and try to hook up foreign body. This failing, thump back hard between shoulders, whilst head is bent forward.

In children, hold legs uppermost, and thump back.

If necessary, do Artificial Respiration.

Always send for Doctor.

HÆMORRHAGES CLASSIFIED WITH THEIR TREATMENT.

1.—**External,** as from most cuts or wounds.

Treatment :

Press on bleeding point with finger, thumb, or with pad of antiseptic gauze and firm bandage

If wound is deep, plug it with piece of antiseptic gauze

If bleeding be from an artery, press close to wound between it and heart

If bleeding be from a vein, press on side away from heart

Pressure may also be made by means of a tourniquet, consisting of pad placed on pressure point, strap, cord or bandage encircling limb and pad, and tightening arrangement such as a stick

In bleeding below knee or elbow, apply pad in bend of joint and flex limb.

2.—**Internal.**

Signs and Symptoms :

Giddiness
Faintness
Loss of strength
Face and lips pale
Shallow sighing, breathing weak pulse
Patient gasps for air, and becomes unconscious.

Treatment :

Absolute rest
No stimulants
Send for Doctor.

Hæmorrhage may also be Classified as :—

ARTERIAL.	VENOUS.	CAPILLARY.
Scarlet colour Blood spurts Pressure point is on heart side of wound.	Dark colour Flows in slow continuous stream Issues from side of wound further from the heart.	Red Colour Flows briskly in a continuous stream or only oozes from the wound Wells up from all parts of the wound

BITES OF SNAKES AND RABID ANIMALS, AND WOUNDS BY POISONED WEAPONS.

†Place at once Constriction between wound and heart to prevent blood carrying poison through body.

Encourage bleeding for a time by bathing wound with warm water and by keeping limb low.

Cauterize wound with Caustic potash, pure Carbolic acid or Nitric acid, or if these are not at hand, with a red hot wire.

Cover wound with clean dressing.

Support injured part.

Treat shock.

BURNS AND SCALDS.

Burns are caused by dry heat, as fire, hot iron, corrosive acids as oil of vitriol, corrosive alkalies as caustic soda, ammonia, quick lime.

Scalds are caused by moist heat, as boiling water, hot oil or tar.

N.B. THE GREAT DANGER OF BURNS IS SHOCK.

The Six Degrees of Burns :—

1.—Mere reddening of the skin
2.—Formation of a bled or blister between true and scarf skins
3.—Partial destruction of true skin
4.—Complete destruction of the skin
5.—Charring of soft tissues beneath skin
6.—Complete charring of the limb.

Treatment :—Treat shock by wrapping patient in warm clothes ; if conscious, give hot tea, coffee, milk, soup, brandy, etc. Exclude air from burn by applying oily substances, as Carron oil (equal parts of linseed oil and lime water), cod-liver oil, vaseline, cream, boric ointment on several pieces of lint, flour or dusting powders. Where hand or foot is burnt, place injured part in water (temperature 100° Fah.), adding a dessertspoonful of baking soda to a basinful of water, and dress as stated.

N.B. :—Clothing to be removed by cutting with scissors. Blisters not to be pricked.

Burns Caused by Corrosive Acid :—Bathe part with weak alkaline solution, as baking soda.

Burns Caused by Alkali :—Bathe part with weak acid solution, as vinegar with equal part of water.

WHAT TO DO WHEN A WOMAN'S DRESS CATCHES FIRE.

If front of dress on fire, lay flat on back } flame is
If back of dress on fire, lay face downwards } uppermost.

Smother flame with anything at hand (blankets, rug, coat, table-cover ; these made wet if possible).

Treat shock and burns (if any) in the manner already stated.

SCALDS DUE TO CHILDREN SUCKING SPOUTS OF KETTLES CONTAINING BOILING WATER.

Results :—Swelling of inside of windpipe, threatening to choke the child.

Treatment :—

1.—Apply to front of neck reaching from chin to top of breast bone, a sponge wrung out of very hot water.

2.—Sit child upright in front of fire

3.—Give cold water to sip, or ice to suck ; olive oil or salad oil

Send for Doctor.

APOPLECTIC FITS.

Signs and Symptoms :—

Sudden or gradual insensibility, face flushed, breathing loud and snoring, pupil of one eye larger than that of other, occurs usually in elderly persons.

Treatment :

Send for Doctor, raise and support head, loosen tight clothing. Apply cold to head. *Don't give stimulants.*

HYSTERIA.

Usually young girl : suddenly loses command of her feelings and actions, falls suddenly in safe position, laughs, screams, kicks, cries, shakes her hair loose, eyelids open and shut rapidly, feels as if lump in throat (globus hystericus).

Treatment :

Avoid sympathy, and speak firmly to her
Loosen all tight clothing
Douche with cold water
Apply mustard leaf at back of neck.

ECLAMPTIC FITS.

Occur in pregnant women, resemble epileptic fits, but usually last for a shorter time, and rapidly recur.

Treatment :

Same as Epilepsy. Send for Doctor at once.

EPILEPSY.

Signs and Symptoms :—

Patient falls to ground, utters a scream, passes into convulsions, foams at mouth, throws limbs about, often bites tongue, face congested, convulsive movements of muscles, face, neck and limbs.

Treatment :

Loosen tight clothing from around neck and body. Put cork between jaws to prevent biting of tongue. Prevent patient injuring himself. Send for Doctor.

SYNCOPE—FAINTING.

Treatment :

Loosen tight clothing
Bend head forward between knees, if patient is conscious, or
Place him flat on back with head hanging low
Dash cold water in face
Apply smelling salts to nostrils
Give stimulants, fresh air
As last resort, perform Artificial Respiration.

SUFFOCATION BY SMOKE OR GAS.

Remove patient into fresh air
Loosen clothes
Artificial Respiration.

WOUNDS CLASSIFIED, WITH TREATMENT.

1.—**Incised :** One made by sharp instruments, e.g., knives, razors. Wound gapes, edges clean cut.

Treatment :

Stop bleeding by pressure-cleanse with boiled water or antiseptic.

Apply clean dressing and bandage. If wound large, and no Doctor available, bring edges together by plaster strapping.

2.—**Lacerated :** One made by machinery, goring and animal bites, shot or shell. Wound has ragged surface, edges irregularly torn.

Treatment :

Apply clean lint, cover with thick layer of cotton wool, and bandage firmly to stop oozing blood.

3.—**Contused :** One made by blunt instruments, e.g., sticks (*a bruise is a contusion*).

Treatment :

Place the part at rest, and apply an evaporating or spirit lotion.

4.—**Punctured :** One made by sharp pointed instrument (knife, hatpin, bayonet).

Treatment :

Remove weapon, if left in wound, stop bleeding, and apply clean dressing or cotton wool.

5.—**Gunshot and Poisoned Wounds.**

POISONS.

Poison : Any substance which injures health, or destroys life.

POISONS CLASSIFIED.

1.—**Narcotics,** e.g., Opium, and its derivatives and preparations, such as Laudanum, Morphia, Paregoric, Dover's Powder.

2.—**Irritants,** e.g., Arsenic, in Fowler's Solution, Rat Paste, Fly and Wall papers
Antimony, in Tartar Emetic, Butter of Antimony
Lead, in Lead paint, Sugar of Lead, Hair Dyes
Mercury, in Corrosive Sublimate.

3.—**Corrosives,** e.g., Acids—Sulphuric acid, Hydrochloric acid, Nitric acid, Oxalic acid, and Carbolic acid
Alkalis—Caustic Potash and Soda, Strong Ammonia.

4.—**Deliriants,** e.g., Belladonna (deadly nightshade)
Henbane
Strychnine
Aconite
Alcohol.

General Treatment in Case of Poisoning :—

1.—Send for Doctor, giving particulars, and saving the poison.

2.—Give emetic (not in acid or alkali poisoning, or if lips and mouth stained) :
- (*a*) Mustard—dessert-spoonful in tumblerful of luke-warm water
- (*b*) Salt—table-spoonful in tumblerful of luke-warm water
- (*c*) Ipecacuanha Wine—tea-spoonful every 15 minutes for child.

3.—Milk, raw eggs beaten up with milk or water, oil, tea.
N.B.—Oil should never be given in phosphorus poisoning.

4.—If Acid is the poison, give Alkalis (soda, potash, chalk, whiting)
If Alkali is the poison, give Acids (lemon juice, vinegar diluted with equal quantity of water).

Poison.	Symptoms.	Treatment.
Opium.	Tendancy to sleep Contracted pupil Constipation Stertorous breathing Unconsciousness.	Emetic Hot Coffee, or Tea Keep patient awake by slapping with wet towel, moving him about, smelling salts to nostrils.
Arsenic.	Metallic taste in mouth Nausea Headache Thirst Diarrhœa Burning pain in mouth, throat and stomach.	Emetic Milk Beaten-up Eggs Olive oil in table-spoonfuls Barley water Strong Tea.
Acids.	Sour taste in mouth Severe pain from mouth to stomach Lips, mouth, and throat burnt White Staining if Hydrochloric Acid, Yellow if Nitric Blackish if Sulphuric Acid.	No Emetic Wash out mouth with Chalk, Soda, Potash, Whiting, Plaster from walls, Soap suds Milk Olive Oil.
Belladonna.	Pupils dilated Mouth and throat dry Difficulty in swallowing Giddiness and Delirium.	Emetic Lime water Magnesia and water, followed by Strong Tea or Coffee.
Strychnine.	Sense of suffocation Twitching muscles Convulsions Body arched.	Emetic, if swallowing possible Strong Tea Artificial Respiration.

N.B.—In poisoning by Oxalic Acid, do not give Soda or Potash.

DROWNING.

Treatment :—

Remove water and froth from air passages by clearing out mouth and back of throat.

Perform Schafer's method of Artificial Respiration, as follows :—

Lay patient face downwards, head turned to one side

Kneel, facing patient's head, placing your hands on his lowest ribs, one at each side, the thumbs nearly touching each other in small of back

Lean your body forwards

Apply firm pressure downwards upon the back and lower part of chest—Expiration is thus produced

Draw your body back and relax pressure without removing your hands—Inspiration is produced

Repeat this swaying movement twelve to fifteen times a minute

Pending Doctor's arrival, get ready hot bottles, hot flannels, blankets, dry clothing.

COMMON AILMENTS OF SCHOOL CHILDREN.

Disease.	Causes.	Signs and Symptoms.	Advice or Treatment.
Rickets. A disease of Infants, characterised by impaired nutrition, and alteration of the growing bones.	1.—Defective quality of milk or prolonged lactation. 2.—Patent foods. 3.—Unsuitable foods. 4.—Deficiency in fat and proteins. 5.—Defective hygiene, overcrowding, and want of sunlight.	Flabby, pale, sweating head. Restless, cross, throws clothes off bed. Bony changes :— Bones bowed Brow overhanging Teething late, Teeth decay early Rickety–Rosary Thickening at wrist and knee. Spine curved.	Advise re diet. Wet Nurse, if mother's milk poor or not enough. Cream or Cod Liver Oil, Virol. Avoid starchy food. Fresh air, sunlight, warm clothing.
Lateral Curvature (side) **of the Spine.** Girls more frequently affected than Boys.	Unequal length or strength of the legs. One-sided position or use of the body, nursing, lifting or carrying heavy weights with one arm. Debility and Rickets, causing loss of muscular tone and weakness of the ligaments.	Pain or weakness in the back and shoulder. "Growing out of the shoulder." The red line produced on running thumb nail over the spinous processes in the centre of the back will show the curve.	Remove cause. Correct posture. Rest. Massage and exercises of spinal muscles as ordered by Doctor.
Flat Foot.	Long standing. Carrying heavy weights. Bad general health, Rickets. The sole ligaments yield. The muscles which normally support the Arch become relaxed.	The sole is flat, pain felt on walking. Gait shuffling.	Remove cause. Improve general health. Tip-toe exercises. Massage muscles of calf. Support instep by pad.

COMMON AILMENTS OF SCHOOL CHILDREN.—*continued.*

DISEASE.	CAUSES.	SIGNS AND SYMPTOMS.	ADVICE OR TREATMENT.
Anæmia. Deficiency of blood or of blood corpuscles. (bloodlessness).	Loss of blood from any cause. Destruction of blood corpuscles. Food, fresh air, sleep not enough. Overcrowding, teeth decayed. Chronic diseases, as heart disease, consumption.	Giddy, pale, palpitation, Breathless, faintness, constipation.	Remove cause. Improve the hygiene of the home. Recommend necessitous cases for free treatment and suitable food where such are given. (Hospital, Guild of Help, Open Air Schools).
Headache.	Ventilation, drains defective. Defective sight, eye-strain, brain fag. Bad teeth, dyspepsia, commencing disease as :— Fevers Brain tumours Meningitis. *Sight, ventilation, drains defective.* *Eye strain, fag, disease infective.* *Colds, carious teeth, dyspepsia.*		Remove cause. If due to dyspepsia, give ordinary food. Advise milk diet. Defective Sanitation— Report to Medical Officer of Health. Other causes— Report to School Doctor.

Colds.	Dust. Damp clothes or boots. Draughts. Dress unsuitable. Disease (associated with measles, whooping cough, scarlet fever, or infection from a pre-existing case, especially by exchanging handkerchiefs, caps, pencils, etc.	Running at eyes and nose, Sneezing, Cough, Feverishness, Headache.	Prevent by— 1.–Removing cause. 2.–Damp dust rooms. 3.–Avoid draughts, remove damp clothes & boots, followed by hot bath. 4.–Avoid draughts, keep child warm in a properly ventilated room, 5.–Dr. recommended. 6.–Prohibit exchange of handkerchiefs, etc. 7.–Dress suitably for the time of the year. (arms, legs, chest should be specially protected).
Adenoids. Masses of glandular tissue, which spring from the upper and back part of the mouth, opposite the posterior nostrils *Dangers of Neglect* :— 1.–Increasing deafness from blocking of Eustachian tubes. 2.–Mental dulness. 3.–Permanent injury to ears if attacked by Scarlet Fever. 4.–Susceptibility to infectious disease, especially Diphtheria.	1.–Irritation long continued in the neighbourhood of nose and mouth. 2.–Neglected Nasal Catarrh.	Stupid, dull, with open mouth. Snores at night. Nasal twang of voice. Face elongated. Rhinorrhœa (discharge from nose).	Proper use of handkerchief. See Doctor.
Mouth Breathing. *Effects* :— 1.–Sore throat. 2.–Predisposes to infectious diseases & Consumption. 3.–Bronchitis.	1.–Habit ; 2.–Enlarged tonsils and Adenoids.	Child's mouth kept open; is liable to sore throat, with symptoms and signs of adenoids or tonsils, if present.	*Treat cause* :— If habit, train child to breathe through nose. Frequent use of handkerchief. Deep breathing exercises, with mouth closed.

VITAL STATISTICS.

Birth-Rate : The number of births per 1,000 persons living.

How Estimated : Multiply the number of births by 1,000 and divide your answer by the population, *e.g.*, suppose the number of births of a town is 3,000, and the population is 100,000 :

$$\frac{3,000 \times 1,000}{100,000} = \text{Birth-rate.}$$

Death-Rate : The number of deaths per 1,000 persons living.

How Estimated : Multiply the number of deaths by 1,000 and divide your answer by the population, *e.g.* suppose the number of deaths is 2,000, and the population is 100,000, then :

$$\frac{2,000 \times 1,000}{100,000} = \text{Death-rate.}$$

Infantile Death-Rate : the number of deaths of infants under 1 year to every 1,000 births during the same time, *e.g.*, if 300 children under 1 year of age die, and there are 4,000 children born, then :

$$\frac{300 \times 1,000}{4,000} = \text{Infantile Death-rate.}$$

Zymotic Death-Rate : The death-rate from the seven principal Zymotic diseases, viz., Small-pox, Whooping Cough, Measles, Scarlet Fever, Enteric Fever, Typhus, Diphtheria, Diarrhœa.

How Estimated : Multiply the number of deaths from the principal Zymotic diseases by 1,000 and divide by the population, *e.g.*, suppose the number of deaths from these diseases is 200, and the population of the town is 100,000, then :

$$\frac{200 \times 1,000}{100,000} = \text{Zymotic Death-rate.}$$

Zymotic diseases mean febrile constitutional diseases.

Principal Causes of Infantile Mortality :—

1.—Premature Birth.
2.—Illegitimacy.
3.—Congenital defects.
4.—Improper and Contaminated food.
5.—Inexperience and neglect of mothers.
6.—Overlaying.
7.—Diarrhœa, Measles, and Whooping Cough.

STRUCTURE OF A TOOTH.

Each Tooth consists of :—

1.—**A Crown :** the part showing above the gum, and covering this crown a layer of hard material called Enamel.

2.—**A Root :** the part imbedded in the jaw bone, consisting of one or more fangs.

3.—**A Neck :** the constriction seen at the line where the crown and root meet.

4.—**Dentine :** substance resembling bone in its structure and composition, constituting the main substance of the tooth.

5.—**Pulp :** substance containing blood vessels and nerves in cavity of the tooth.

DEVELOPMENT OF TEETH.

At the seventh week of intra-uterine life, the primitive dental groove forms on the surface of the jaws. The downgrowth of epithelium forms the common enamel germ, and from it the enamel is developed. From the bottom of this groove ten papillæ arise. The cavity containing the papillæ becomes surrounded by the dental sac. Thin caps of dentine form on the papillæ of all the temporary set about the fourth month of fœtal life. At birth the crowns of the anterior milk teeth are formed fully. After birth development proceeds, and fangs are formed.

CAUSES OF DECAYED TEETH.

Predisposing :—

Heredity
Disease interfering with teeth's nutrition
Patent foods, resulting in malnutrition.

Determining :—

Acid formed by the action of germs on food left between and on the teeth.

CHILDREN'S ACT

(Provisions),

Prevention of Cruelty.—Anyone over 16 years of age having custody, charge, of child under 14 years of age, or young person under age 16 years, is liable to penalty for Wilfully Assaulting, Abandoning, Illtreating, Neglecting or Exposing such a child in a manner likely to cause unnecessary suffering or injury to health.

Parents failing to provide Clothing, Lodging, Adequate Food or Doctor is held to neglect child.

Prosecutions can be undertaken for Overlaying and Exposure to risks of burning.

Smoking.—No tobacco, cigarettes, or cigarette papers may be sold to persons under age 16. Constable, or Park Keeper, may seize the above if such persons seen smoking in Street or Public place. Boys may be searched, *not Girls.*

Old Metal.—Dealer must not purchase from person under age 16.

Pawning.—Pawnbroker *must not* take any article in pawn from person under age 14.

Sale of Intoxicating Liquor.—No person must give to any child under 5 years any intoxicating liquor, except on Doctor's order, sickness or other urgent cause.

Cleansing Verminous Children.—M.O. of Local Education Authority or other person with his written authority, may examine in such Authorities' Elementary Schools the person or clothing of any child attending such School. If found verminous, foul or filthy, Local Education Authority may give written notice to Guardian or Parent requiring cleansing to be carried out within 24 hours. Written instructions as to the manner in which the cleansing may be best carried out must also be sent. Failure to cleanse, Child may be removed and cleansed at Cleansing Station. If Child gets into a similar condition again, Parent or Guardian may be fined.

Memory Aid.—Cruel pawnbrokers sell metals, smokes and liquor to verminous children.

HOW TO REDUCE INFANTILE MORTALITY.

1.—Encourage breast feeding.

2.—Ensure pure milk supply by systematic inspection of dairies, cowsheds, etc., and insist on properly covered storage receptacles.

3.—Improve the hygiene of the home. Abolish overcrowding.

4.—Remove house refuse and stable manure from the neighbourhood of dwellings.

5.—Enforce Notification of Births Act.

6.—Establish Maternity and Infant Welfare Centres.

7.—Exercise strict supervision over the practices of Midwives.

8.—Appoint an adequate number of Health Visitors.

9.—Prohibit immoral advertisements.

EPIDEMIC OR SUMMER DIARRHŒA.

A form of diarrhœa which especially assails children during their first year of life, in the months of greatest heat.

Causes :—

1.—Bad hygienic surroundings of home (over-crowding, filth accumulations).

2.—Fouling of food (especially milk) by germs carried on feet of flies.

3.—Improper or unsuitable food.

Symptoms :—

1.—Vomiting.

2.—Purging.

3.—Great prostration.

4.—Sunken eyes.

5.—Pallor.

6.—Fever high.

Treatment :—

1.—Ensure cleanliness of home by liberal use of soap and water.

2.—Remove promptly, refuse, manure heaps, etc., from dwellings and their neighbourhood, and keep refuse receptacle clean and covered.

3.—Abolish over-crowding.
4.—Protect food by storing it in properly covered receptacles.
5.—Destroy flies and their breeding grounds.
6.—Encourage breast feeding.
7.—Boil milk if its purity is in doubt.
8.—Allay dust by copious watering.
9.—Give children food suitable to their age.
Stop all food while vomiting persists, and give albumen water.

OPHTHALMIA NEONATORUM :

Inflammation of the eyes of newborn infants, occurring about the 3rd day, is highly infectious, and must always be looked upon as a serious condition.

Causes :—

Gonorrhœa in the mother, vaginal discharge entering child's eyes during or immediately after labour, or communicated after labour by hands, sponge, towels, etc.

Signs :—

Eyelids red, swollen and inflamed.
Discharge serous at first, later purulent.

Dangers :—

1.—Ulceration of the Cornea.
2.—Opacities of the Cornea.
3.—Perforation of the eye.
4.—Blindness.

Treatment :—

1.—If Gonorrhœa suspected in mother, give vaginal douch (biniodide of mercury 1 in 5,000 or Izal 1 in 200) before commencement of, and after, labour.
2.—Wipe infant's eyes with clean rag immediately head is born.
3.—Drop 2 drops of a 2 per cent. solution of Nitrate of Silver into the eyes and subsequently
4.—Wash the eyes with boracic lotion 4 or 5 times daily.

N.B.—On the slightest evidence of inflammation or discharge in connection with infant's eyes or maternal passage, Doctor should be sent for.

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DUTIES OF HEALTH VISITOR.

Vary in different localities. Usually they include visiting in connection with—

1.—Births (Notification of Births Act).
2.—Infant diarrhœa.
3.—Infant and Maternity Welfare Centres.
4.—Consumption in the homes.
5.—Insanitary homes.
6.—Non-notifiable infectious diseases.
7.—Practice of Midwives.
8.—Out-workers.
9.—Factories and workshops in which women are employed.

DUTIES OF SCHOOL NURSES.

1.—Attend at Medical Inspection of School Children—
  (a) Weigh, measure, dress and undress children for Doctor.
  (b) Arrange children for sight testing.
  (c) Examine children's heads for vermin, and body for dirt, etc., and draw Doctor's attention to any shortcomings.
  (d) Fill in certain details on register or card, such as child's previous illnesses, family history, etc.

2.—Visit Schools in the intervals between the routine Medical Inspections, to examine head and body of children.

3.—Visit homes of children suffering from Scabies, Ringworm, etc., and urge importance of treatment.

4.—Follow up untreated cases.

5.—Assist at treatment Clinic.

Infant Care.

How Municipal Authorities Feed Babies.

At all times an individual and universal duty, the conservation of infant life is to-day a vital necessity to the nation—and whilst leading journals are publishing earnest and much-needed opinions and suggestions on this subject, a glimpse at one phase of the work executed by certain Municipal Authorities should be helpful to the many interested in this great field.
This " phase " has to do with infant-feeding, and particularly with the problem of securing a pure and standard milk supply.

Throughout the country there are Municipal Authorities whose object is to improve babies' chances of permanent health and fitness. A number of them have solved the problem with Glaxo. Many such Authorities experimented with Glaxo upon its introduction some years ago, with the result that they continue to purchase and use it in ever-increasing quantities. Among the many Official Bodies continuously using Glaxo many be metioned the following :—

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Rotherham Corporation, over ..	**65,000**	**„**
Bradford Health Department, over	**50,000**	**„**
Lincoln Health Department, over ..	**25,000**	**„**
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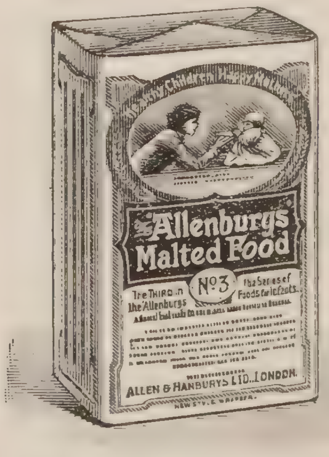

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